

From Montana's Capital City

Cloudy
66° High
48° Low
Details 2A

Downside

Study says supplement McGwire favors could have harmful side effects

Sports ▼ 1B



HELENA INDEPENDENT

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Clinton
targets link
between
entertainment
and violence
among
children

'Daily' violence

WASHINGTON (AP) — President Clinton, brandishing a cartoonish magazine ad for a video game "more fun than shooting your neighbor's cat," ordered a government investigation Tuesday into whether — and how — the entertainment business markets violence to children.

"Our children are being fed a dependable daily dose of violence," Clinton said, that amounts to the typical child witnessing 40,000 play murders and 200,000 dramatized acts of violence by his 18th birthday.

Such a barrage blurs the line between "fantasy

and reality violence," the president said.

"I know this stuff is coming out of the wood from a lecture time has come to shape a short-term impact."

The \$1 million, 1995 Department and Federal initiative from the Clinton administration to an increasing

'Summit' angers wolf advocates

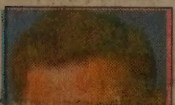
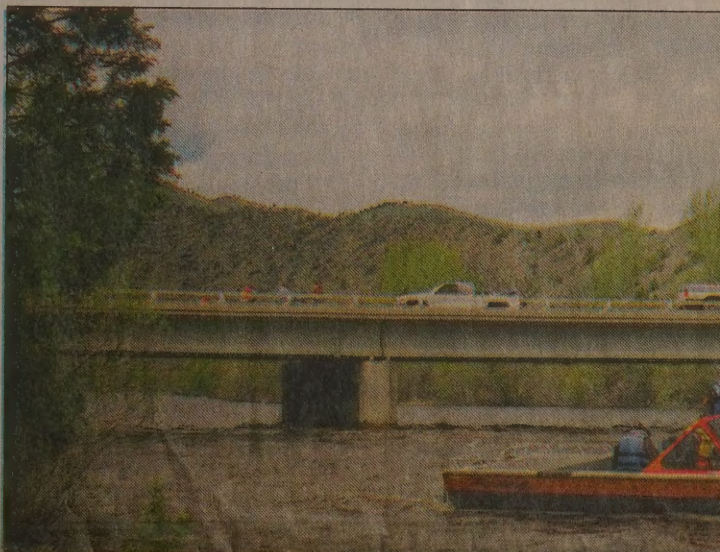
Say they should also have been invited

By PAULA CLAWSON
IR Staff Writer

A "wolf summit" being hosted by U.S. Sen. Conrad Burns, R-Mont., today in Helena has come

under attack from a wolf advocacy group.

Big Hole rafting



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a year full of history



Join the IR
in heralding
the turn of the
century and the
millennium

Wednesday

June 2, 1999

Helena teen admits
stealing guns in
burglary — page 3A

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Helena, Montana • Phone 447-4000 • irstaff@helenaair.com • Vol. 55, No. 189



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"Our children are being fed a dependable daily dose of violence," Clinton said, that amounts to the typical child witnessing 40,000 play murders and 200,000 dramatized acts of violence by his 18th birthday.

Such a barrage blurs the line between "fantasy

and reality violence" for too many young people, the president said.

"I know this stuff sells," Clinton exhorted Hollywood from a lectern in the Rose Garden. "But the time has come to show some restraint, even if it has a short-term impact on the bottom line."

The \$1 million, 18-month review by the Justice Department and Federal Trade Commission is the latest initiative from a president grasping for solutions to an increasingly deadly spate of shootings in

(More CLINTON, page 8A)



President Clinton holds an advertisement for a violent video game while speaking in the Rose Garden of the White House on Tuesday.

AP photo

'Summit' angers wolf advocates

Say they should also have been invited

By PAULA CLAWSON
IR Staff Writer

A "wolf summit" being hosted by U.S. Sen. Conrad Burns, R-Mont., today in Helena has come under attack from a wolf advocacy group.

Burns announced two weeks ago that he would host a meeting to discuss the impact of the wolf reintroductions with Montana's agriculture community and the federal agencies that manage the reintroduction.

The Predator Project, which supports wolf reintroduction efforts, criticized Burns for not extending an invitation to their group. The Predator Project is a Bozeman-based nonprofit group dedicated to protecting predators and their habitat.

THE SUMMIT is similar to a meeting Burns held in 1998.

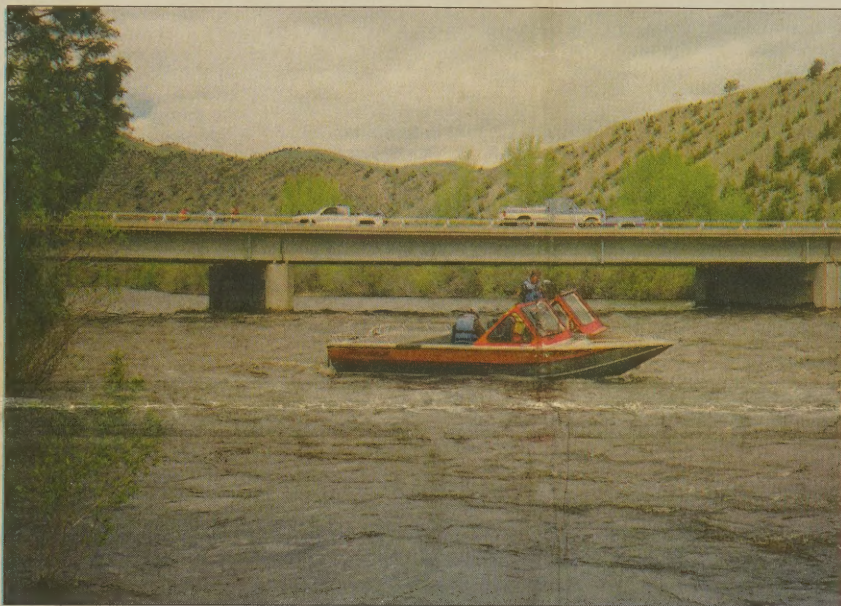
"We would have liked to have known in advance about this and been invited," said David Gaillard of the Predator Project. "In years past there's been a similar event that has kind of been a grand-standing against wolves without much good science to back it up."

BURNS HAS always been a vocal opponent of wolf reintroduction and plans to discuss the future of delisting wolves as an endangered species.

Although the ultimate goal of wolf reintroduction is to establish a population that is large enough to support delisting, Gaillard claims it is premature to try to

(More WOLF, page 8A)

Big Hole rafting tragedy



(Butte) Montana Standard photo by Walter Hinick
Rescuers float the Big Hole River southwest of Butte Tuesday in search of Roxy Oak, 22, of Helena, who is missing and presumed drowned. Oak was among four people who fell into the swollen river after their raft capsized Sunday. One woman drowned and two men survived.

Helena woman still missing; officials begin accident probe

By KIM SKORNOGOSKI
Lee News Network

The Butte-Silver Bow County attorney's office launched an investigation Tuesday into a Sunday rafting accident on the Big Hole River near Divide that left one woman dead and another woman missing and presumed dead.

Two men and two women went into the river after their raft capsized at the Divide pumphouse spillway. The men swam to shore. Sandra Townsend, 48, of Bozeman, drowned. The search continued Tuesday for Roxy Oak, 22, of Helena.

Deputy County Attorney Carlo Canty, who will head the accident investigation, said officers will

look at the river conditions, whether signs were properly posted indicating a spillway and the condition of the oarsman, Kenneth Hellwinkel, 44, of Bozeman, including the possibility he had been using alcohol.

Hellwinkel was Townsend's boyfriend. "We want the matter to be fully and fairly investigated," said Canty. "We need some scientific testing done and we also need to complete an on-scene investigation."

The fourth rafter, Steve Townsend, 24, was the son of Sandra Townsend and the fiancé of Roxy Oak.

Butte Police Capt. John Walsh said Tuesday that Hellwinkel's blood had been drawn when he was taken to St. James Community Hospital, but it will take 10 days to determine if he had consumed alcohol.

Canty said there is no law against drinking while operating a non-motorized craft.

Meanwhile, volunteers flocked to the Big Hole River Tuesday to aid Beaverhead and Butte-Silver

(More WOMAN, page 8A)

Helena settles old-trash issue with Carroll

Deal costs the city \$411K

By EVE BYRON
IR Staff Writer

The trash bill for accidentally burying Helena's garbage on Carroll College property 20 years ago is about \$411,000, according to a signed agreement reached between the city and the school on Tuesday.

The settlement includes about \$187,600 to install a methane gas management system; \$178,000 to buy about 1.64 acres (or \$2.50 per square foot) of garbage-filled Carroll property; and \$45,000 to cover technical and legal fees incurred by the private college.

The rotting trash creates methane gas, which can travel underground and is highly explosive under certain situations.

A LOW-INTEREST loan from the state is expected to provide the money up front and will be repaid by Helena residents through garbage fees. Those rates were raised last year, partly in anticipation of the costs of resolving this problem.

"Basically, we caved into (sic) the Carroll College position on nearly every point," City Manager Dennis Taylor wrote in a memo to commission members.

The agreement signed by Taylor and Carroll College President Matthew Quinn will be presented to the city commission for ratification on June 7 and to the college's executive committee on June 11. Barring any problems, construction on the methane extraction system should begin this summer.

"I don't expect any problems on our end or on the other end," Quinn said.

APPROXIMATELY 31,000 TONS of garbage — about a year's worth of trash for the city of Helena — was discovered on Carroll property, next to the city's landfill almost two years ago.

The rotting trash creates methane gas, which can travel underground, can seep into buildings and is highly explosive under certain situations.

THE COLLEGE WANTED to make sure the city either cleaned up or bought the tainted land; protected the college from future migration of the methane gas; protected the college against future lawsuits arising from the possible migration; and paid for its fees.

"Our executive committee was clear that we didn't want to make a profit on this," Quinn said Tuesday. "We just wanted to be restored to the status quo."

Although discussions between the city and college general-

(More SETTLES, page 8A)

INSIDE

Three Sections

City/Obit.....1C/2C
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Movies.....3B
Markets.....5B
Nation/World.....6B
Opinion.....4A
Sports.....1B
Television.....6A



STATE GOVERNMENT

Medicaid money hard to spend

By ERICA CURLESS
IR State Bureau

Federal strings are making it difficult for the state to spend the \$2.8 million it has to sign up needy Montanans for Medicaid, state officials said Tuesday.

During the 1996 welfare overhaul, Congress gave the states a total of \$500 million to help people make the transition from public assistance to work. Montana's share was about

\$2.8 million, but the state has only spent \$6,500 in three years. It has until February 2000 to spend the remainder, but nobody seems sure of how to dole out the funds.

Hank Hudson, state Child and Family Services administrator, said the problem stems from how Congress treats all states alike, giving them a lump sum of cash regardless of whether it's needed for their welfare changes.

Hudson said Montana

Welfare-to-work money barely tapped — 6B

doesn't need as much cash for Medicaid outreach as some other states because there are fewer people to educate about the federal health insurance program for the poor and disabled. That's because Montana's welfare recipients are eligible to remain on Medicaid and there are fewer needy people to sign up for the federal health insurance.

In other words, outreach programs such as public announcements, recruitment efforts and training aren't needed as much in Montana.

States that ended the link between welfare and Medicaid need more federal cash to ensure that people know they cannot qualify for both welfare

(More MONEY, page 8A)



MHP tallies tickets after first holiday with speed limit — 2A

[illegible]

Comics & Crossword

The Independent Record

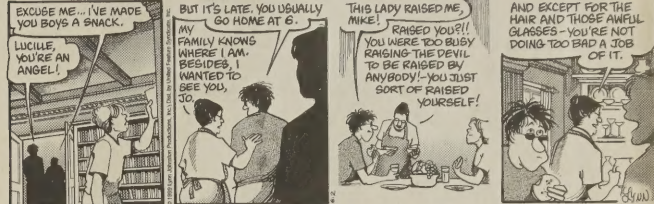
AGAINST THE GRAIN



PEANUTS



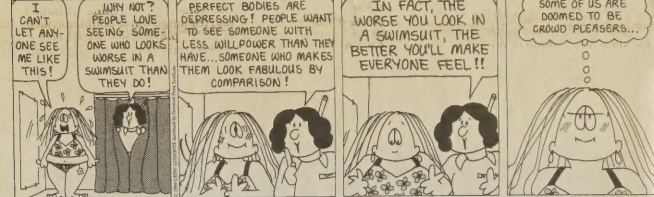
FOR BETTER OR FOR WORSE



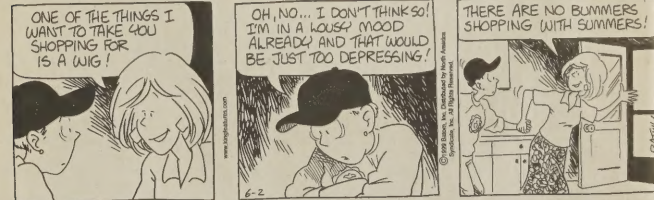
BEETLE BAILEY



CATHY



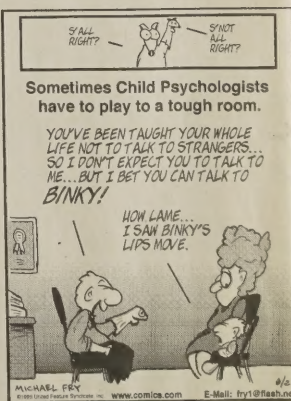
FUNKY WINKERBEAN



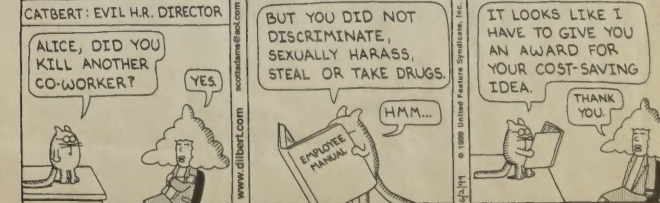
FAMILY CIRCUS



COMMITTED



DILBERT



HAGAR



BLONDIE



REAL LIFE ADVENTURES



DENNIS THE MENACE



GARFIELD



CROSSWORD

ACROSS

- 1 April forecast
- 5 Highland headgear
- 8 Regarding
- 12 German car
- 13 _-Wan Kenobi
- 14 Gush forth
- 15 Dear
- 17 Blue hue
- 18 Chores
- 19 Little Pig's building material
- 21 "The Avengers" role
- 24 Spoonbender Geller
- 25 Soccer org.
- 28 "Rubaiyat" poet
- 30 Bran source
- 33 Frankster
- 34 Lower the lids
- 35 AP rival
- 36 Aerobics center
- 37 Take it easy
- 38 Cruising
- 39 Figure head? (Abbr.)
- 41 Steering site
- 43 Lethargy inducer
- 46 Preamble
- 50 Oz

DOWN

- 1 Absorbed
- 2 Mystique
- 3 15th sometimes, 13th more often
- 4 It ain't worth a dime
- 5 Addition-ally
- 6 Simbel
- 7 Fail to meet
- 8 Moving
- 9 Not genuine
- 10 Ship-building wood
- 11 Temple U. team
- 16 Doctrine
- 20 Constantinopolitan
- 22 Beauty mark
- 23 Mennonite sect
- 25 Grafton's "for Noose"
- 26 Pump up the volume
- 27 Roomy
- 29 Stud fee?
- 31 Do like
- 32 Tamara Mowry's sister
- 34 Neighbor's kid?
- 38 Embryo-onic membrane
- 40 Leg warmer
- 42 Driver's ID
- 43 Norwegians' patron saint
- 44 Yearn
- 45 Part of Sam-I-Am's entree
- 47 Ripped
- 48 Repentant one
- 49 buco
- 52 Same-old, same-old
- 53 What-ever number

Solution time: 28 mins.

Yesterdays answer 6-2

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BlueCross BlueShield of Montana

St. Peter's Hospital

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Top: Helena I.R. 9
Corr. Measures

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a year full of history

Wednesday

June 2, 1999

Helena teen admits
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RECORD

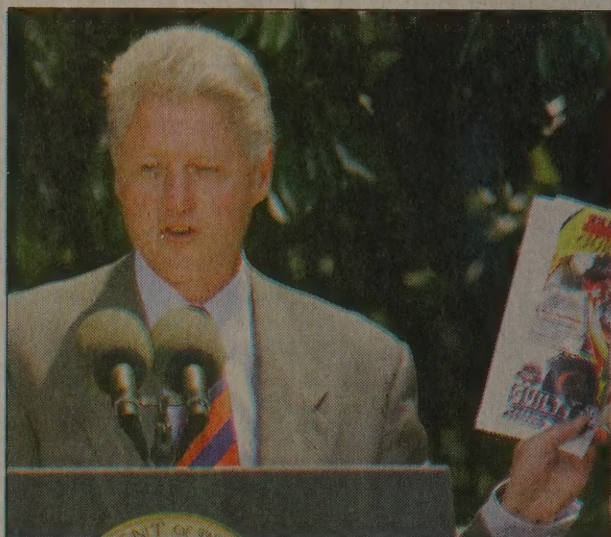
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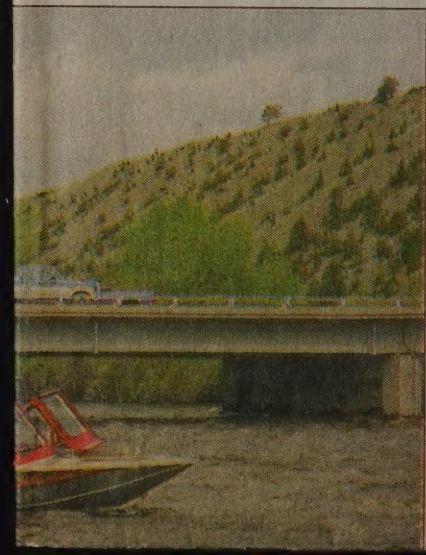
(More CLINTON, page 8A)



President
Clinton
holds an
advertis-
ment for a
violent video
game while
speaking in
the Rose
Garden of
the White
House on
Tuesday.

AP photo

tragedy



Helena settles old-trash issue with Carroll

Deal costs the city \$411K

By EVE BYRON
IR Staff Writer

The trash bill for accidentally burying Helena's garbage on Carroll College property 20 years ago is about \$411,000, according to a signed agreement reached between the city and the school on Tuesday.

The settlement includes about \$187,600

The settling

From Joe Meek

TCE

Potentiometric
Contours



Wolf

Continued from Page 1A

delist the wolf now.

"If things go as well as they have been, we could look at delisting in three years or so, but it is more likely five or six years out," Gaillard said. "It seems like Burns and others are talking about declaring premature success."

A spokesman for Burns said the main focus of the meeting is to keep dialogue open between the agriculture community and the wolf management agencies.

"Basically this is an effort to bring together all the people who have complaints and problems with the wolf situations with the people who can help solve those problems," said Matt Raymond of Burns' Washington D.C. office. "The last summit was successful

in that there were steps the (U.S.) Fish and Wildlife Service were able to talk about and solve."

Raymond said the conservation group Defenders of Wildlife was issued an invitation to attend the summit. A spokesman for Defenders of the Wildlife wasn't available for comment late Tuesday afternoon.

"Primarily the individuals invited are the people who have been contacting our office over and over about wolf problems. This meeting is not exclusionary, the public is invited, but in terms of the limited time we have we don't know how much opportunity there will be for public input," Raymond said.

The meeting will be from 1 to 3 p.m. today in the Bollinger hearing room at the Public Service Commission building at 1701 Prospect Avenue.

cers from Butte-Silver Bow and Beaverhead counties will continue to float the river periodically throughout the summer.

"We found a lot of scattered belongings, but no sign of the lady," Reeder said. "At this point, to be frank, we have no idea where she's at. We're going to be relying on fishermen and guides from here on out, many of whom have already been involved in the search."

Reeder said the water was 38 degrees, causing the body to stay at the bottom of the river, which has hovered near flood level, until temperatures warm. Rescuers believe Oak couldn't have survived more than a few minutes in the cold water.

Kim Skornogoski is a reporter for the (Butte) Montana Standard.

Woman

Continued from Page 1A

Bow counties search and rescue teams and officers from the Montana Department of Fish, Wildlife and Parks.

Beaverhead County Sheriff Keith Reeder said 20 people with area search and rescue units, another 20 river guides and outfitters in nearly 10 boats and eight or nine kayakers covered nearly 30 miles of river.

Two dogs trained to find bodies were brought from Missoula Tuesday to search the same stretch of river between the Divide Bridge, where Oak was last seen, to about 20 miles downstream to Glen.

Unless the dogs are alerted to something Tuesday night, the organized search will cease, officials said. Search and rescue offi-

Settles

Continued from Page 1A

ly were amicable, Carroll officials were only a day away from filing a lawsuit to resolve the dispute over legal and technical fees.

"Their board of trustees instructed Dr. Quinn to file a lawsuit this morning unless we paid the \$45,000," Taylor said Tuesday.

Taylor was convinced that those fees were covered under the \$2.50 per square foot price tag for the college property, since the city recently bought land near Carroll for 9 cents a square foot.

However, Quinn and college trustees thought differently, and decided last weekend to prepare the lawsuit papers.

"We wanted to keep the conversation going and the statute of limitations had already been extended" a few times, Quinn said. "We decided against seeking to extend the deadline yet again for the purposes of conversation."

Two weeks ago, Taylor offered to pay \$31,000 for the college's consulting fees. Carroll countered with a request of \$50,000, but later came down to \$45,000. Taylor asked the college to agree to \$40,000, but no deal was reached.

Money

Continued from Page 1A

and Medicaid programs.

"There were not as many outreach problems or system changes as in other states," Hudson said.

The money Montana has spent went toward operational costs and buying lap-top computers so state workers can sign up eligible Medicaid clients outside Helena and the regional offices.

Nancy Ellery, state Health Policy and Services Division administrator, said Congress attached a lot of strings to the cash, limiting its use to helping people get off welfare.

President Clinton is considering expanding states' ability to spend the money, Ellery said. That means Montana could then use the money to notify people about the new Children's Health Insurance Plan, which will provide coverage for 10,000 uninsured children.

Montana isn't alone, Ellery added. Wyoming hasn't spent a cent of its \$2.5 million grant. Cal-

ifornia is in the same category.

By allowing welfare recipients to also have Medicaid eligibility, Montana was creating a larger safety net to help people achieve self-sufficiency.

Montana has had great success in getting people off welfare and into jobs. But the state is also experiencing a drop in its Medicaid rolls. Since January 1997, more than 2,000 Montana adults and 7,000 children have lost their Medicaid coverage.

Some welfare advocates argued this decline is caused by harsh welfare reform programs.

Hudson isn't sure why this is happening, but said it's important for Montanans to know they are still eligible for Medicaid if they're enrolled in the state welfare system.

Hudson added that the state plans to find other ways to spend the federal Medicaid outreach dollars before the February 2000 deadline, even if Clinton doesn't expand the spending rules.

Clinton

Continued

the nation's schools. Having already introduced new gun controls, Clinton trained on the entertainment industry's business practices the same microscope he focused on cigarette companies, and their juvenile-aimed Joe Camel ads, when he cracked down on teen smoking.

Clinton said federal investigators will "study the extent to which the video game, music and movie markets do actually market violence to children" and whether those industries only laxly restrict sales to minors.

FTC CHAIRMAN Robert Pitofsky said his staff will, as in probes of the tobacco and alcohol industries, look into the entertainment companies' internal marketing records even if it takes subpoenas.

"I would hope we could talk to these companies and get voluntary compliance. But certainly if we feel that we can't complete our responsibility here, we're going to turn to compulsory processes," Pitofsky said.

Douglas Lowenstein, president of the Interactive Digital Software Association, promised cooperation with a "fair-minded review."

ON THE DAIS with Pitofsky, first lady Hillary Rodham Clinton and Attorney General Janet Reno, Clinton held up several colorful video-game ads that he considered offensive.

One, for the game "N2O Nitrous Oxide," showed a souped-up handgun and promised: "More fun than shooting your neighbor's cat." Another, for a PlayStation package called "Guilty Gear," pictured comic-book-type warriors lobbing fireballs. "Kill your friends guilt-free," it beckoned.

"If you look at some of these ads, it's hard to argue with a straight face that the games were made for adults in the first place," Clinton said.

"Advertisements have a particular role here. They have the power to egg children on and lure them in."

BY ORDERING the study himself and paying for it with existing funds, Clinton pre-empted a Senate-passed measure introduced by Kansas Republican Sam Brownback.

Senate Judiciary Committee Chairman Orrin Hatch, R-Utah, released a statement welcoming Clinton and his "newfound interest" to the Republican fold.

The president's Rose Garden announcement came three weeks after he and Mrs. Clinton convened a meeting of movie-industry lobbyist Jack Valenti and five dozen of the nation's leading educators, officials, entertainers and gun makers to brainstorm a national campaign against youth violence.

ON MONDAY, Valenti's spokesman, Rich Taylor, said the Motion Picture Association of America had no comment on the impending FTC study. A separate entertainment industry source, however, suggested Clinton was alienating Hollywood just as it was trying to help his cause.

The WB network recently shelved two violent episodes of "Buffy, the Vampire Slayer," and CBS yanked a bloody new drama series about the mob from its fall lineup after April's high school massacre in Littleton, Colo.

Said Lowenstein, whose trade association represents video game developers: "The nation should not lose sight of the fact that parents — not kids — buy most games. And therefore, keeping games not appropriate for children out of their hands starts and ends at home."

I would hope we could talk to these companies and get voluntary compliance. But certainly if we feel that we can't complete our responsibility here, we're going to turn to compulsory processes.'

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Joseph Farms Cheese

2 lb. Blocks, Assorted Flavors.....\$4⁷⁹

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CORRECTIONS

Woman not always parade flag bearer

Evelyn Pippett, who was featured in a front page story Tuesday about the East Helena Memorial Day parade, has participated in the parade since 1970, but has not been the flag bearer every year.

4-H group misidentified

A Sunday story in the Independent Record misidentified the 4-H group involved in the county's Adopt-A-Roadway program. The name of that group is the Canyon Creek 4-H Stock Club.

LOTTERY

Cash 4 Life: 55-59-90-94.

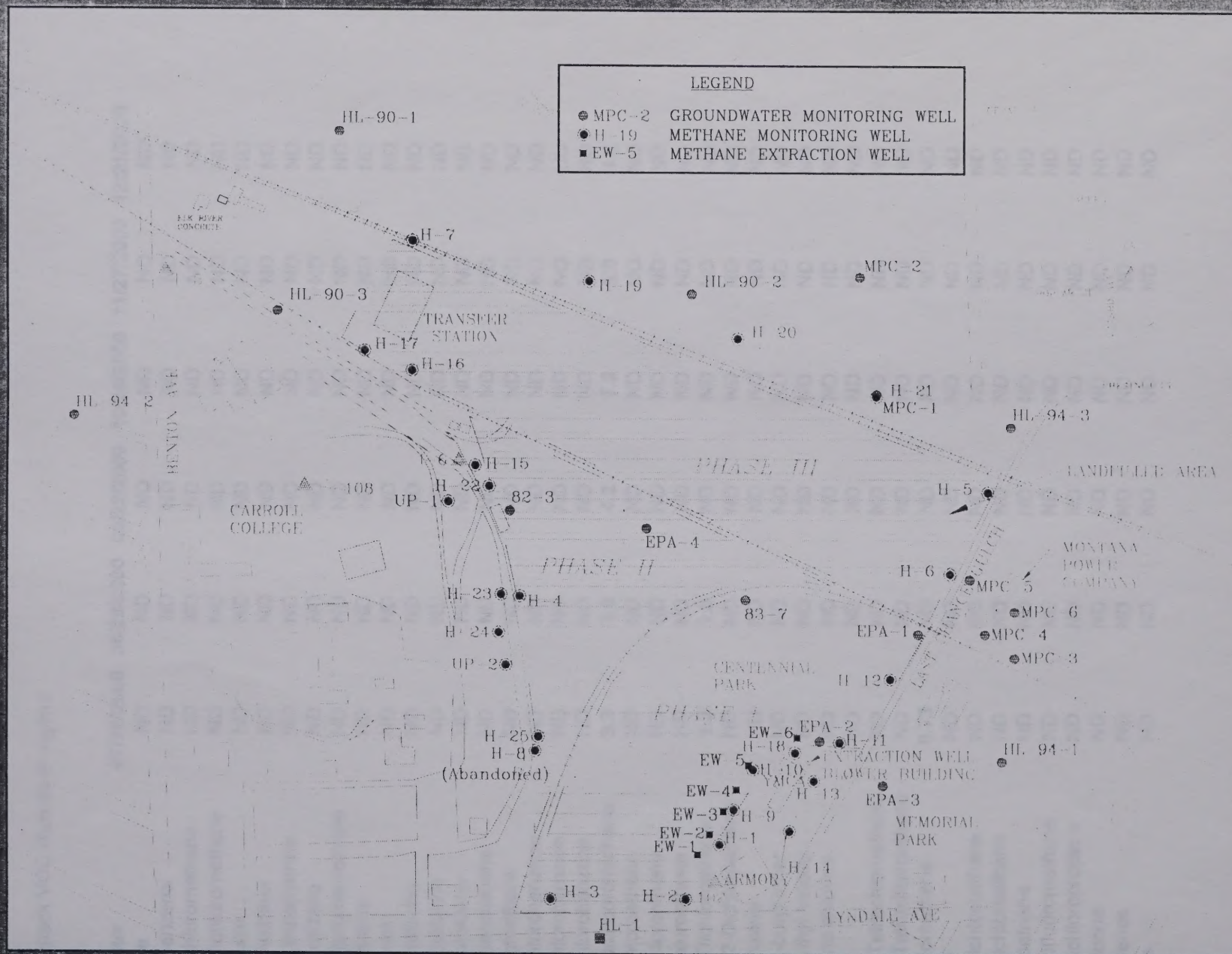
From Joe Mack



90 County L+C
Facility & # Helena 1.7
Closure Landfarm
Finan Assur Liner
GW Corr Meas Methane
GW Monitoring O & M
GW Reports Run - On
Inspections
Other: _____

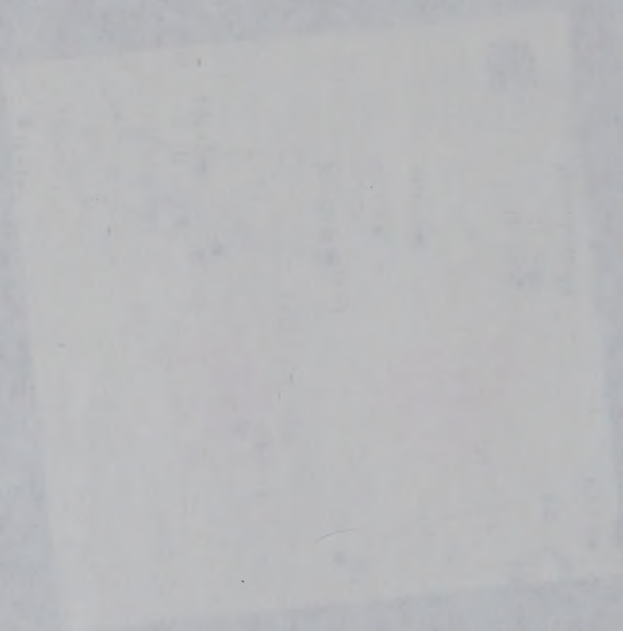
Landmark
Liner
Methane
O & M
Run - On

Report
to Monitor
for Corrosion
and Asset



Hydrometrics, Inc.

Consulting Scientists, Engineers, and Contractors



YMCA Stack VOC Results in mg/m3

Parameter	07/25/2000	08/29/2000	09/22/2000	10/26/2000	11/27/2000	12/21/2000
Benzene	ND	ND	ND	ND	ND	ND
Bromobenzene	ND	ND	ND	ND	ND	ND
Bromochloromethane	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND
Chlorodibromomethane	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND	ND
Chloromethane	ND	ND	ND	ND	ND	ND
2-Chlorotoluene	ND	ND	ND	ND	ND	ND
4-Chlorotoluene	ND	ND	ND	ND	ND	ND
1,2-Dibromoethane	ND	ND	ND	ND	ND	ND
Dibromomethane	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	3.3	3.6	4.2	7.2	5.0	4.0
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	1.2	1.0	ND	ND	ND	ND
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND
Methyl-t-butyl ether	ND	ND	ND	ND	ND	ND
Methyl ethyl ketone	ND	ND	ND	ND	ND	ND
Methylene chloride	ND	ND	ND	ND	ND	ND
Styrene	ND	ND	ND	ND	ND	ND
1,1,1,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND
Tetrachloroethene	0.73	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND
Trichloroethene	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	ND	ND	ND	ND	ND	ND
1,2,3-Trichloropropane	ND	ND	ND	ND	ND	ND
Vinyl chloride	ND	ND	ND	ND	ND	ND
m+p-Xylenes	ND	ND	ND	ND	ND	ND
o-Xylene	ND	ND	ND	ND	ND	ND

YMCA Stack VOC Results

Parameter	01/30/2001	02/22/2001	03/30/2001	04/20/2001	05/18/2001
Benzene	ND	ND	ND	ND	ND
Bromobenzene	ND	ND	ND	ND	ND
Bromochloromethane	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND
Carbon tetrachloride	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND
Chlorodibromomethane	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND
Chloromethane	ND	ND	ND	ND	ND
2-Chlorotoluene	ND	ND	ND	ND	ND
4-Chlorotoluene	ND	ND	ND	ND	ND
1,2-Dibromoethane	ND	ND	ND	ND	ND
Dibromomethane	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND	ND
Dichlorodifluoromethane	4.2	4.3	7.8	4.9	3.4
1,1-Dichloroethane	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND
Methyl-t-butyl ether	ND	ND	ND	ND	ND
Methyl ethyl ketone	ND	ND	ND	ND	ND
Methylene chloride	ND	ND	ND	ND	ND
Styrene	ND	ND	ND	ND	ND
1,1,1,2-Tetrachloroethane	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND
Tetrachloroethene	ND	ND	(1.3)J	ND	(1.4)J
Toluene	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND
Trichloroethene	ND	ND	ND	ND	ND
Trichlorofluoromethane	ND	ND	ND	ND	ND
1,2,3-Trichloropropane	ND	ND	ND	ND	ND
Vinyl chloride	ND	ND	ND	ND	ND
m+p-Xylenes	ND	ND	ND	ND	ND
o-Xylene	ND	ND	ND	ND	ND

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8/4

Legals

LEGAL NOTICE PUBLIC MEETING

The City of Helena has applied for an addendum to its approved Corrective Measures Assessment for the Helena landfill. The addendum will address implementation of a well collection system to capture contaminated groundwater leaving the landfill site. The public meeting to gather information on the proposal will be held on August 12, 1999 at 7:00 p.m. in the Commission Chambers on the third floor of the City/County Building to discuss the proposed actions. Comments received will be submitted for review by the Montana Department of Environmental Quality along with the amendment to the corrective measures assessment. Interested parties are invited to attend. Anyone needing more information may contact Ted Hill at 447-1575.

July 17, 24, August 4, 1999

Legals

LEGAL NOTICE PUBLIC MEETING

The City of Helena has applied for an addendum to its approved Corrective Measures Assessment for the Helena landfill. The addendum will address implementation of a well collection system to capture contaminated groundwater leaving the landfill site. The public meeting to gather information on the proposal will be held on August 12, 1999 at 7:00 p.m. in the Commission Chambers on the third floor of the City/County Building to discuss the proposed actions. Comments received will be submitted for review by the Montana Department of Environmental Quality along with the amendment to the corrective measures assessment. Interested parties are invited to attend. Anyone needing more information may contact Ted Hill at 447-1575.

July 17, 24, August 4, 1999

7/24

Public Meeting addendum to Corrective Measures Ass.

A public meeting was held in the City Commission Chambers at 5:00 PM on Aug 12 as advertised in the Helena Independent Record on July 17, 24 and August 4, 1999.

In attendance were:

Jeff Tawney City of Helena Acting PWD
Ted Hill Env. Eng-
Mike Wignot Hydrometries
Todd Bingham Hydrometries
Pat Potts DEQ
Bill Thompson Hydrometries

LEGAL NOTICE PUBLIC MEETING

The City of Helena has applied for an addendum to its approved Corrective Measures Assessment for the Helena landfill. The addendum will address implementation of a well collection system to capture contaminated groundwater leaving the landfill site. The public meeting to gather information on the proposal will be held on August 12, 1999 at 7:00 p.m. in the Commission Chambers on the third floor of the City/County Building to discuss the proposed actions. Comments received will be submitted for review by the Montana Department of Environmental Quality along with the amendment to the corrective measures assessment.

Interested parties are invited to attend. Anyone needing more information may contact Ted Hill at 447-1575.

PUBLISH: July 17, 24 and August 4, 1999

LEGAL NOTICE PUBLIC MEETING

The City of Helena has applied for an abandonment to its approved Consecutive Management Agreement for the Helena landfill. The abandonment will address implementation of a well designed system to capture condensed gas without leaving the landfill site. The public meeting to gather information on the proposal will be held on August 12, 1998 at 7:00 p.m. in the Conference Room on the third floor of the City County Building to discuss the proposed action. Comments received will be submitted for review by the Montana Department of Environmental Quality along with the abandonment to the consecutive management.

Interested parties are invited to attend. Anyone needing more information may contact Ted Hill at 447-1575.

PUBLISHED: July 17, 24 and August 4, 1998

File: Lewis & Clark Co.
City of Helena (inactive)
grd wtr (corr. meas)

Montana Department of

Environmental Quality

MEMO

To: SW File: Lewis & Clark Co., City of Helena
From: Pat Potts³
Date: August 13, 1999
Subject: Ground Water Corrective Measures - Public Meeting

The public meeting for the second addendum to the ground water corrective measures for the City of Helena's inactive Class II landfill was held on August 12, 1999 at 7:00 pm in the City-County Bldg. (see attached newspaper advertisement). The following people were in attendance:

Ted Hill - City of Helena

Jeff Towery - acting Public Works Director for the City

Jodi Bingham - Hydrometrics

Bill Thompson - Hdrometrics

Mike Wignot - Hydrometrics

Pat Potts - MDEQ

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Legals

LEGAL NOTICE PUBLIC MEETING

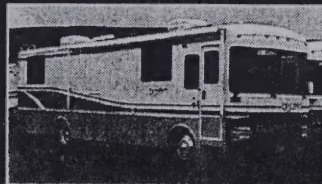
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July 17, 24, August 4, 1999

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July 21, 1999

Mr. Ted Hill
Environmental Engineer
Wastewater Division
City of Helena
1708 Custer Ave.
Helena, MT 59601

*File: Lewis & Clark Co
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grd wtr (Corr Meas)*

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JUL 22 1999

MONTANA

**DEPT. OF ENVIRONMENTAL QUALITY
COMMUNITY SERVICES BUREAU**

RE: Reporting Requirements for City of Helena Landfill Groundwater Remediation

Dear Ted,

This letter is to provide clarification on the reporting requirements for groundwater remediation at the City of Helena landfill as discussed in our meeting on July 6, 1999 with you and Pat Potts and Pat Crowley of the Montana Department of Environmental Quality and subsequent phone conversations with Pat Potts. Two reports will be required. The first is a technical report summarizing the well installation, pump test results, and water sample results. This report is included in the scope of work and budget for the Contract Addendum for the Groundwater Remediation Pilot Study (Phase I) submitted to Kim Milburn on May 18, 1999. The second report is an addendum to the Corrective Measures Assessment required by MDEQ to change the City's preferred remediation alternative for the groundwater contamination at the landfill. This report was included in the preliminary budget for Full-Scale Implementation (Phase II), presented to the City Commission in February 1999 (Figure 21, Groundwater Remediation Cost Summary, MDEQ Regulatory Interaction and Reporting). Although a formal scope of work and budget has not been approved for this phase of the work, this report must be written and submitted to the MDEQ by August 1 to get their approval in time for the public meeting already scheduled for August 12, 1999. If you have any questions or concerns, please don't hesitate to call.

Sincerely,

Jodi Bingham, E.I.
Environmental Engineer/Chemist

c: Mike Wignot, Hydrometrics
Pat Potts, MDEQ
Pat Crowley, MDEQ

9/1/99

BRAUNSM

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1-800-279-6100

Pat,

All of your changes have been made. See yellow sticky for a paragraph I added.

This document is in share for your signature...

g:\csb\sws\l+chel.crw 3
P

INITIALS ³ DATE 9/1/99

SOLID WASTE OUTGOING CORRESPONDENCE ROUTE SLIP (ONLY)

☐ **NEW APPLICATION**

Initial / Date

Rick T.

Pat C.

Nancy (Proof)

Cathy

Jon D.

☐ **NEW LICENSE**

Initial / Date

Rick T.

Pat C.

Nancy (Proof)

Carol

Cathy

Jon D.

☐ **HEALTH OFFICER CARD**

Initial / Date

Rick T.

Carol

Cathy

☐ **INSPECTIONS**

Initial / Date

Pat C.

Nancy (Proof)

Carol

Jon D.

☐ **INTERIM CLOSURES**

Initial / Date

Rick T.

Pat C.

Nancy (Proof)

Carol

Cathy

Jon D.

☐ **CLOSURES**

Initial / Date

Rick T.

Pat C.

Nancy (Proof)

Carol

Cathy

Jon D.

☐ **CHANGE IN LICENSE
FOR FEE STATUS**

Initial / Date

Rick T.

Pat C.

Nancy (Proof)

Cathy

☐ **COMPLAINTS**

Initial / Date

Pat C.

Nancy (Proof)

Carol (filing & DBase)

☒ **GROUND WATER**

Initial / Date

Nancy (Proof)

Pat C.

RICK T

9/7

9-13-99

☐ **GENERAL CORRESPONDENCE**

Initial / Date

Pat C. / Rick T.

Nancy (Proof)

Jon D. (As Needed)

Mark Steger Smith (As Needed)

☐ **MISCELLANEOUS**

Initial / Date

☐ **FILE**



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GW Monitoring

GW Reports

Inspections

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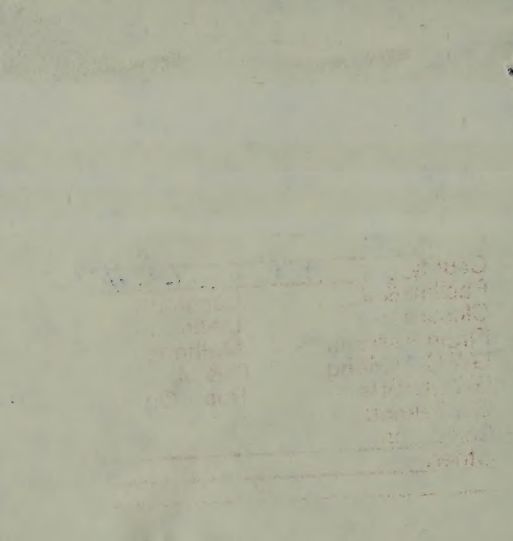
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Montana Department of
ENVIRONMENTAL QUALITY

Marc Racicot, Governor

P.O. Box 200901 • Helena, MT 59620-0901 • (406) 444-2544 • E-mail: www.deq.state.mt.us

September 13, 1999
Dennis Taylor, Manager
City of Helena
316 North Park
Helena, Montana 59623

**RE: LEWIS & CLARK COUNTY, CITY OF HELENA CLASS II LANDFILL (CLOSED)
- LICENSE NO. 90
GROUND WATER CORRECTIVE MEASURES - APPROVAL OF THE SECOND
ADDENDUM TO THE CORRECTIVE MEASURES ASSESSMENT**

Dear Dennis:

The Department has reviewed the "Second Addendum to the Corrective Measures Assessment for the Helena Landfill" dated August, 1999, and has determined the selected remedy meets the requirements of ARM 17.50.710(7)(b). In conjunction with ARM 17.50.710(6)(d), the City held a public meeting on August 12, 1999, at the City-County Building in Helena to discuss the currently proposed corrective measures assessment (i.e., second addendum). There was no discussion at this meeting and no public comments need to be addressed.

Selected Ground Water Remediation Technology

The selected remedy consists of a ground water pump and treat system designed to capture impacted ground water hydraulically downgradient from the landfill boundary at the relevant point of compliance (RPOC). The contaminated water will be discharged through sprayer heads into an existing lined (20 ml. polypropylene) pond located on the Bill Roberts Golf Course (near the 7th hole). From the pond, it will be sprinkled/land applied onto the golf course during times when the course is not in use. This remediation system will only be operable in the summer months when freezing will not occur, because the system will not be winterized.

Discharge of Treated Ground Water

According to the Montana Water Quality Act 75-5-605(2), MCA, a ground water discharge permit will be required when the concentration of pollutants in the discharge water is higher than the ground water to which it is returned. Licensed solid waste management systems, operated in conformance with the Montana Solid Waste Management Act and associated rules, are not required to have a discharge permit according to 75-5-401(5)(b), MCA because they are already being regulated by the Department to the same environmental standards required by the Water Protection Bureau. Thus, the Waste Management Section requires the City of Helena to meet the general permit standards for the discharge of treated water, providing the protection envisioned in the exemption.

Enclosed is a copy of Department guidance entitled "Disposal of Contaminated Ground Water" by Abe Horpestead. We have followed this document in preparing the requirements for this project.

Specific standards regarding the City of Helena Landfill remediation pump and treat system are:

- Treated wastewater may only be discharged into or over ground water that has the same or higher concentrations of the parameters of concern. According to Figure 10 "Groundwater PCE concentrations (mg/L)" from the February 1999 Hydrometrics presentation to the Helena City Commissioners, average concentration in the ground water beneath the eastern half of the golf course appears to be less than 1 µg/L. Some parts of the golf course are above the MCL. Different treatment standards would apply depending on where the water is discharged. According to Hydrometrics, it is not possible at the current time to isolate sections of the irrigation system and apply water from different sources to different parts of the golf course.
- If wastewater is treated below the required reporting value (RRV), as defined in WQB Circular 7, it may be discharged in areas outside the contaminated aquifer, i.e., in the eastern half of the golf course. The RRV for tetrachloroethene is 0.5 µg/L. The concentration of tetrachloroethene will be required to be below the RRV before the treated discharge water infiltrates into the ground beneath the area of the eastern half of the golf course in order to prevent an increase in the areal extent of the existing plume.
- Blow out water from the lines may be discharged to the areas around the wells without sampling, as per the Horpestead guidance.

Sampling Requirements

Upon yearly start-up of the system, the Department strongly suggests an appropriately calibrated field gas chromatograph be used to analyze pond water samples on-site to insure contaminant concentrations are below the RRV before the treated discharge water is land applied.

During the first season of operation, the Department will require monthly samples be collected and analyzed for the VOCs listed in Table 1 of ARM 17.50.708, during operation of the ground water remediation system. These samples are in addition to the quarterly proposed sampling of the pumping wells and monitor well HL-90-1.

Sample the water in the east storage pond near the irrigation intake. If the concentration of tetrachloroethene is below the RRV in the pond, the discharge water may be land applied without further sampling. If tetrachloroethene is detected in the pond water, a pan/rain gauge type sample(s) will need to be collected during sprinkling of the golf course to insure levels of tetrachloroethene are below regulatory limits during land application (i.e., entering the ground). In order to achieve the required level in the final phase (i.e., land application on the golf course),

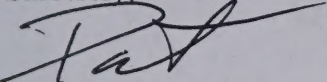
Dennis Taylor
Page 3
September 13, 1999

we suggest the water detained in the pond be aerated to further reduce the concentration of tetrachloroethene, should it be detected. In the event that this does not sufficiently lower the levels of contaminants, additional, Department approved, treatment of the water will be required prior to land application.

Approval

The Department approves the ground water pump and treat remediation system as required by ARM 17.50.710(7)(b)(v), including the above outlined conditional sampling requirements for the discharge water. The construction, startup, and testing of the system, including the transmittal of initial sample results to the Department, must be completed by June 30, 2000. This approval may be withdrawn if the discharge limits are not achieved.

Sincerely,



F. Patrick Crowley
Solid Waste Regulatory Program Manager

cc: Jodi Bingham, Hydrometrics, Inc., Helena, MT

Attachment, Horpestead 1997

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DISPOSAL OF CONTAMINATED GROUND WATER
AS REGULATED BY THE MONTANA WATER QUALITY ACT
AND IMPLEMENTING RULES

Abe Horpestad
2 October 1997

CONCLUSIONS: Discharge of purge water or treated ground water to the ground and subsequent infiltration of that water into the soil is not pollution, is not degradation, and does not require a permit provided that there is no surface runoff, the soils at the discharge point are not contaminated by the discharge, the infiltrated water will have a quality equal to or better than the contaminated ground water, and it will return to the ground water in the same aquifer from which it was extracted.

INTRODUCTION

Contaminated ground water exists at many sites throughout Montana. This contamination is the result of historic discharges and releases of pollutants, as well as recent and continuing spills of pollutants. In order to evaluate the extent and severity contamination of pollution at a site it is necessary to sample the ground water. This sampling results in small amounts of "purge water". As used here, "purge water" means water removed from a well before water sampling to ensure that the water sample represents water from the aquifer rather than from the well. Purge water is generally allowed to infiltrate to the ground water by discharging it on the ground next to the well.

In most cases of ground water contamination the ground water is actively treated to remove pollutants after the extent and severity of the pollution is determined by sampling. Treatment results in significant quantities of "treated ground water" which must be discharged. "Treated ground water" means water resulting from treatment of ground water that was contaminated by spills or releases of pollutants. Ground water treatment systems also generally discharge to the ground water, often through land application or infiltration trenches.

State water quality requirements for the disposal of these waters have become an issue. This paper contains my analyses of this issue and applies to disposal of purge water resulting from sample collection and the treatment of contaminated ground water. The legal requirements for disposal of these water are nearly identical. This analysis does not apply in cases where the discharged water enters surface water, to long term pump tests, to mine adits, or to the original source or cause of the ground water contamination. This analysis applies only to the requirements of the Montana Water Quality Act (MCA., 75-5-101 et seq) and the rules that have been adopted to implement the Act. There may be other requirements under other laws, such as if

the water contains listed or hazardous wastes.

The applicable parts of the prohibited activity section of the State Water Quality Act states that "(1)It is unlawful to: (a) cause pollution . . . of any state waters or to place or cause to be placed any wastes where they will cause pollution of any state waters . . . (d) cause degradation of state waters without authorization pursuant to 75-5-303: ... (2) ...without a current permit . . . (c)discharge sewage, industrial wastes, or other wastes into any state waters."(75-5-605, MCA).

Thus, in order to comply with state water quality requirements disposal of contaminated ground water must not:

1. Cause pollution of any state water
2. Cause the placement of materials where they will cause pollution of state waters
3. Cause degradation of any state water (unless such degradation is authorized)
4. Discharge sewage, industrial, or other wastes to state waters without a permit.

ALL FOUR REQUIREMENTS MUST BE SATISFIED.

The act defines "pollution" as " . . . contamination or other alteration of the physical, chemical, or biological properties of state waters which exceeds that permitted by Montana water quality standards . . . or the discharge, seepage, drainage, infiltration, or flow of liquid, . . . or other substance into state waters which will or is likely to create a nuisance or render the waters harmful, detrimental, or injurious . . . "(75-5-103(21), MCA).

In some cases, contaminated ground water includes visible pollutants including free product such as diesel fuel, gasoline or solvents, which may be extracted with the purge water or the water to be treated. Discharge of such water and the associated pollutants would generally be placement of wastes where they will cause pollution of state waters. The remainder of this analysis applies only when the discharge water contains only soluble pollutants and no visible pollutants are present.

DISPOSAL OF PURGE WATER

1. The disposal of unaltered purge water to the ground water from which it was extracted will not contaminate or alter that ground water because the quality of the discharged water will be equal to or better than the "receiving water". The concerns here are that the discharge does not place materials where they will cause pollution, and that the water actually returns to the water from which it was withdrawn.
2. Discharge of purge water, at the well site, which contains only soluble or dissolved

pollutants is not a placement of wastes that will cause pollution at a latter date. The mass of pollutants in this discharge water is very small compared with the soil volume, and the pollutants are mobile in soil, or they would not be in the water, and thus they will pass through the soil and return to the ground water. Remember, this must be the same ground water that the purge water came from.

3. "Degradation means a change in water quality that lowers the quality of high-quality waters for a parameter . . . " (75-5-103 (4), MCA).

The discharge, seepage or infiltration of unaltered purge water to the ground water from which it was pumped or to the same plume of contaminated water where the pollutant concentrations are higher will not cause degradation for the reasons, and under the conditions, given above concerning pollution.

4. Under the ground water rules ""Discharge" means the addition of any pollutant to waters of the state."(17.30.1001(2), ARM).

The discharge, seepage or infiltration of unaltered purge water to the ground water from which it was pumped will not require a discharge permit because there will be no addition of "industrial wastes" or "other wastes" to waters of the state.

DISCHARGE OF TREATED GROUND WATER

The considerations given for purge water generally apply to the disposal of treated ground water. However, the discharge of treated ground water is complicated by the larger volumes of water that are discharged. These larger volumes of water require a larger infiltration area and thus the discharged water may return to ground water which has a lower concentration of pollutants. If this occurs, it would be a placement of wastes where they will cause pollution. The discharge will require a ground water discharge permit, unless it is excluded under 75-5-401(5)(b), MCA. and may be subject to the nondegradation requirements of state law.

If it is certain that the treated water is returned to ground water where the concentration of pollutants is the same or higher than the concentration in the discharge water, such a discharge would not be pollution, would not require a ground water permit, and would not be subject to the nondegradation requirements of state law. This certainty does not have to be provided by a ground water permit. It could be provided by other department oversight. For example it could be provided by the remediation division during the clean-up of a contaminated site. If other oversight by the department is lacking a ground water permit would be required.

QUESTIONS AND ANSWERS ON THE
DISPOSAL OF CONTAMINATED GROUND WATER
IN ACCORDANCE WITH THE MONTANA WATER QUALITY ACT
AND IMPLEMENTING RULES

by
Abe Horpestad
October 23, 1997

The answers to the following questions all assume that the water does not contain visible pollutants and will not flow to surface water.

1. How can I dispose of purge water during the first sampling of a new well when I don't know if the water contains pollutants or not?

Answer: If the well log indicates that the water is from the uppermost aquifer the water can be poured on the ground next to the well and allowed to infiltrate. If the water is from a deeper aquifer such disposal is not allowed.

2. I know that the concentration of some parameters in my purge water is above WQB-7 standards, can I allow this water to infiltrate next to the well?

Answer: Yes, If the water will return to the aquifer from which it was extracted.

3. Can I allow purge water to infiltrate through soil that is contaminated?

Answer: Yes, if the soil contamination caused the ground water contamination.

4. I have accumulated a quantity of contaminated purge water, how can I dispose of it?

Answer: One way would be to allow it to infiltrate in a area where it will reach ground water which already has the same or higher concentrations of all pollutants than the purge water.

5.
purge10.23

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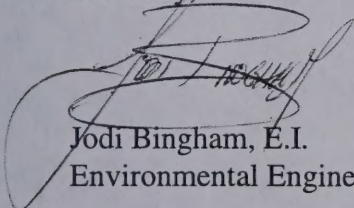
Mr. Ted Hill
Environmental Engineer
Wastewater Division
City of Helena
1708 Custer Ave.
Helena, MT 59601

RE: Reporting Requirements for City of Helena Landfill Groundwater Remediation

Dear Ted,

This letter is to provide clarification on the reporting requirements for groundwater remediation at the City of Helena landfill as discussed in our meeting on July 6, 1999 with you and Pat Potts and Pat Crowley of the Montana Department of Environmental Quality and subsequent phone conversations with Pat Potts. Two reports will be required. The first is a technical report summarizing the well installation, pump test results, and water sample results. This report is included in the scope of work and budget for the Contract Addendum for the Groundwater Remediation Pilot Study (Phase I) submitted to Kim Milburn on May 18, 1999. The second report is an addendum to the Corrective Measures Assessment required by MDEQ to change the City's preferred remediation alternative for the groundwater contamination at the landfill. This report was included in the preliminary budget for Full-Scale Implementation (Phase II), presented to the City Commission in February 1999 (Figure 21, Groundwater Remediation Cost Summary, MDEQ Regulatory Interaction and Reporting). Although a formal scope of work and budget has not been approved for this phase of the work, this report must be written and submitted to the MDEQ by August 1 to get their approval in time for the public meeting already scheduled for August 12, 1999. If you have any questions or concerns, please don't hesitate to call.

Sincerely,



Jodi Bingham, E.I.
Environmental Engineer/Chemist

c: Mike Wignot, Hydrometrics
Pat Potts, MDEQ
Pat Crowley, MDEQ

County

L+C

Facility & #

Helena #90

Closure

Landfarm

Finan Assur

Liner

GW Corr Meas

Methane

GW Monitoring

O & M

GW Reports

Run - On

Inspections

Other:

10

Landings
Liner
Melbourne
O & M
Kun - Ch

From Asia
CW Con Line
CW Atlantic
CW Pacific
CW Europe

... ..
... ..



Date	By	Checked	Project Number	Page
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FAT:

THANKS YOU VERY MUCH FOR
THE USE OF THIS SPEC. AND
FOR YOUR VALUABLE REVIEW
COMMENTS. YOU WERE THE
ONLY ONE TO COMMENT ON THE
WARNING TAPE BEING LOCATED AT
THE SURFACE ON THE DRAWING.
THANKS AGAIN!

Dan Tiefenthaler

Helena
~~CMTA~~
Corr. Measures

Montana Department of

MEMO

Environmental Quality

To: Rik Thompson, Pat Crowley RT
From: P. Potts
Date: June 25, 1999
Subject: City of Helena - ground water

Analytical results from the center (alluvium) recovery well, showed a concentration of 240 µg/L of tetrachloroethene. Analytical results from the east and west wells have not come back yet. Hydrometrics has proposed to do a verification sample from the center well early next week.

Following receipt of this data, we will all get together to review updated (draft) maps with the exact well locations, etc. to determine the direct to proceed in remediation efforts at the site.

County L & C

Facility & # Helena 90

Closure

Landfarm

Finan Assur

Liner

GW Corr Meas

Methane

GW Monitoring

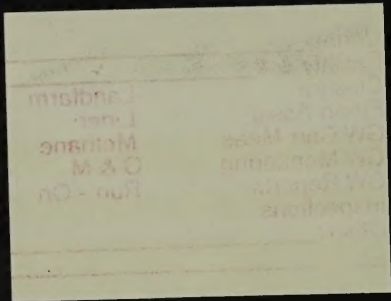
O & M

GW Reports

Run - On

Inspections

Other: _____





Hydrometrics, Inc.

consulting scientists, engineers & contractors

2727 Airport Road
Helena, MT 59601
(406) 443-4150
Fax: (406) 443-4155 or
(406) 443-1252
www.hydrometrics.com

September 30, 1998

Patc
RECEIVED

OCT 01 1998

Kim Milburn
Public Works Director
City of Helena
316 North Park Ave.
Helena, MT 59623

MONTANA
DEPT. OF ENVIRONMENTAL QUALITY
COMMUNITY SERVICES BUREAU

RE: Minutes of 9/22/98 City of Helena Landfill Methane and Groundwater Remediation Meeting

Dear Kim:

This letter is to transmit the minutes of the September 22, 1998 meeting between the City of Helena and the Montana Department of Environmental Quality (MDEQ) in regards to the City of Helena landfill methane and groundwater remediation.

Attending: Kim Milburn, City of Helena
Ted Hill, City of Helena
Pat Potts, MDEQ
Pat Crowley, MDEQ
Ken Kapsi, MDEQ
Mike Wignot, Hydrometrics, Inc.
Jodi Bingham, Hydrometrics, Inc.

Existing YMCA Gas Extraction System

- Jodi Bingham gave an update of the existing YMCA gas extraction system.
 - Hydrometrics is currently increasing flows in gas extraction wells EW-2, EW-3 and EW-4 to try to further reduce methane concentrations in monitoring probes HL-9, HL-10 and HL-18.
 - A second carbon canister for off-gas treatment to eliminate possibility of discharge after breakthrough in first canister is scheduled for next week. (Installed September 28, 1998.)
- Pat Crowley considers HL-9, HL-10 and HL-18 compliance wells as the YMCA building area was never permitted with the landfill. Pat will send information showing the permitted boundary to Ted Hill for his files.
- Jodi Bingham will prepare a map with all extraction wells, monitoring probes, groundwater sampling wells, etc. She will send a copy to Pat Crowley with October monthly report.

to through the hands of the
the American Department of
the United States and
the State of New York
the State of New York
the State of New York

Proposed Carroll College Gas Extraction System

- Jodi Bingham gave an update on the proposed Carroll College gas extraction system.
 - Methane probes along west boundary are being monitored monthly.
 - Hydrometrics presented six alternatives to the City in April and are waiting for Carroll College and the City to work out the property boundary issues before continuing design phase.
- Kim Milburn indicated that the City has been working with Carroll College to try to resolve their differences. In a meeting with Lynn Etchart and Tom McCarvel, a verbal agreement was reached in which the City would regain all the landfilled property (new facility boundary would extend 30 feet west of existing garbage). He will get back in touch with them this week about finalizing the deal.
- Once this issue has been resolved, the design phase can continue.
 - Ted Hill said that their budget for this fiscal year includes the Carroll College gas extraction system.
 - A passive trench and piping with the capability for a future retrofit with a blower, should the need arise, was agreed upon by the City and Pat Crowley as the best option.
 - The City has the option to repermit the landfill to include the Carroll College property; however, reopening the permit is a lot of work and isn't necessary according to Pat Crowley. Pat recommended that the trench be installed and the monitoring probes on the west side of the trench be used as the compliance points, even though they are technically beyond the permitted property boundary.

Groundwater Remediation

- With the YMCA gas extraction system installed and the Carroll College gas extraction system in the works, groundwater remediation is the remaining concern.
- Pat Crowley presented a draft letter stating that with the current gas quality at the YMCA gas extraction system, a global gas extraction system would not improve groundwater quality and another corrective measure should be selected. Pat also noted that a gas sample collected from the Carroll College side may yield different results that could support the use of a global gas extraction system for groundwater remediation.
- Compliance wells MPC-1 and HL-90-1 still exceed the MCL's for perchloroethene (PCE).
- Pat Potts stated that concentrations of PCE in I-4 have been increasing and other wells that have previously been clean now have detectable concentrations. It is her opinion that the plume is spreading.
- The City was given two years to monitor the existing gas extraction system to evaluate the affects on groundwater quality. However, Pat Crowley had previously stated that because the system was not global, the two-year monitoring period did not apply here.

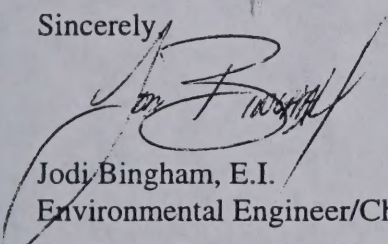
- Alternatives for groundwater remediation included seasonal irrigation and air sparging.
- Pat Potts suggested the City (Hydrometrics) began modeling the groundwater and investigating the irrigation alternative.
- The state has GMS (version of Modflow) and would like the input files to double check Hydrometrics' modeling results.
- Pat Crowley stated that MDEQ was not likely to consider natural attenuation as a remediation alternative.

Schedule

- For compliance of YMCA gas extraction wells (bringing monitoring probes into compliance), Pat Potts thought the two-year period already agreed to was sufficient.
- For the Carroll College gas extraction system, the property issues should be settled and an alternative selected by the end of October with design and construction to be completed by next summer.
- For the groundwater remediation, the groundwater modeling for irrigation well installation and further investigation of the air sparging alternative should be completed by the end of October.
- Another meeting similar to this one was tentatively scheduled for the week of October 26th to discuss the progress on the Carroll College gas extraction system and to present the results of the groundwater modeling.

If you have any questions or comments concerning this summary, please feel free to call me.

Sincerely,



Jodi Bingham, E.I.
Environmental Engineer/Chemist

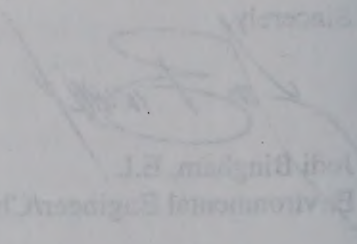
c: Ted Hill, City of Helena
Pat Potts, MDEQ
Pat Crowley, MDEQ
Ken Kapsi, MDEQ
Mike Wignot, Hydrometrics

- Alternative for groundwater remediation included natural migration and air sparging.
- The Board suggested the City (Hydrogeology) begin modeling the groundwater and investigate the migration alternative.
- The staff has (LHS) (version of Model) and would like the input data to double check Hydrogeology's modeling results.
- The County stated that AIDCO was not likely to consider natural migration as a remediation alternative.

Schedule

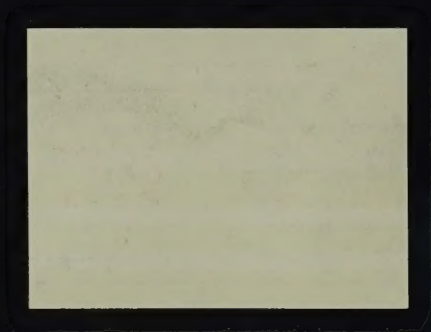
- The completion of YMC's gas extraction wells (bringing monitoring probes into compliance) for Point through the two-year period already agreed to was sufficient.
- For the Carroll College gas extraction system, the property issues should be settled and an alternative selected by the end of October with design and construction to be completed by next summer.
- For the groundwater remediation, the groundwater modeling for nitrogen well installation and further investigation of the air sparging alternative should be completed by the end of October.
- Another meeting similar to this one was tentatively scheduled for the week of October 16th to discuss the progress on the Carroll College gas extraction system and to present the results of the groundwater modeling.

If you have any questions or comments concerning this summary, please let me know by return mail.

Respectfully,

Ted Hill, E.E.
Environmental Engineering

cc: Ted Hill, City of Helena
Pat Rott, MDEQ
Pat Carver, MDEQ
Ken Rapp, MDEQ
Mike Wagner, Hydrogeology

County L & C
Facility & # Helena 90
Closure Landfarm
Finan Assur Liner
GW Corr Meas Methane
GW Monitoring O & M
GW Reports Run - On
Inspections
Other: _____



CITY OF HELENA LANDFILL

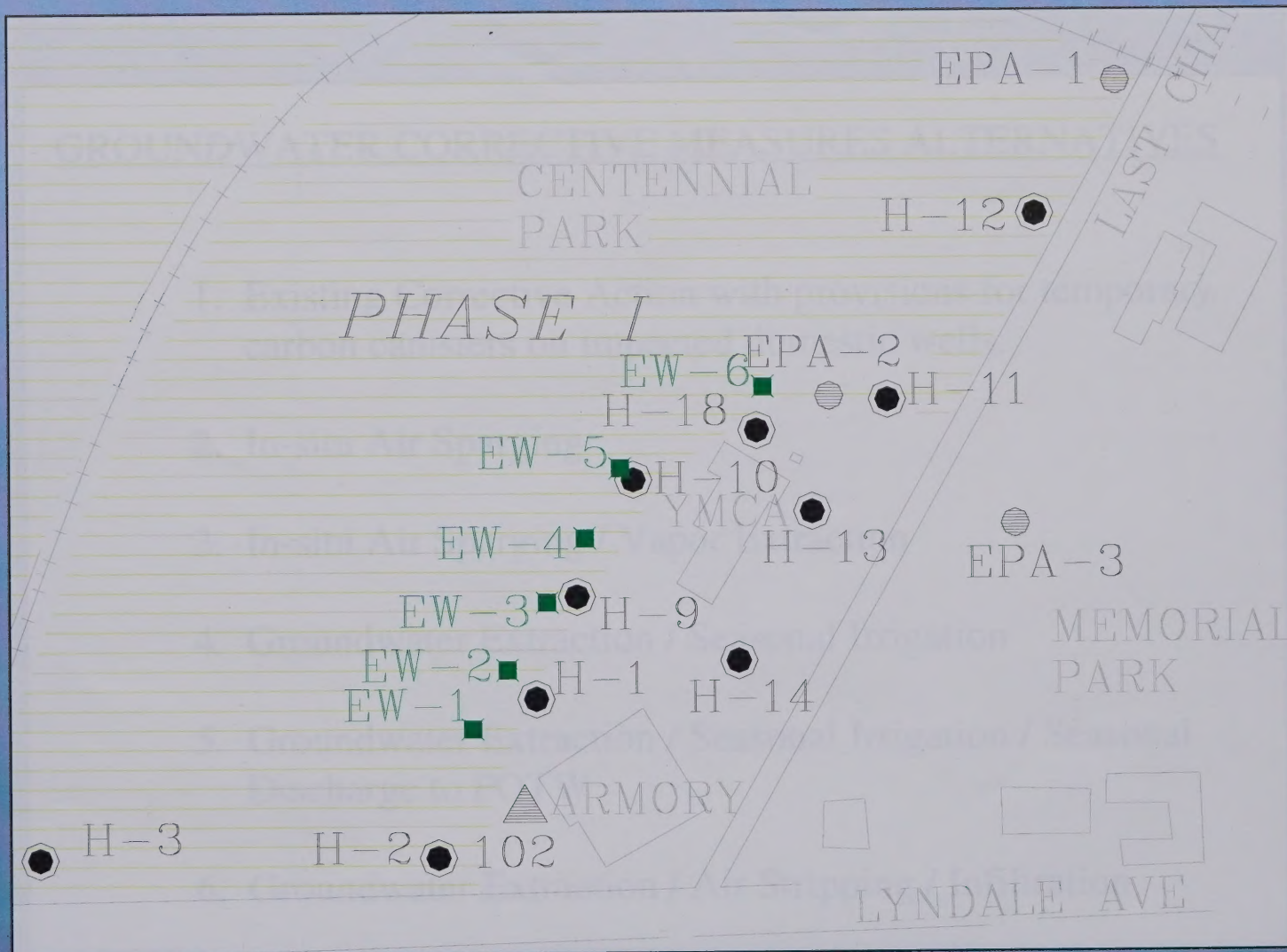
MEETING AGENDA

OCTOBER 28, 1998

13:30-15:00

- ✓ 1. YMCA Gas Extraction System
 - Current Status
- ✓ 2. Carroll College Gas Extraction System ** negotiations on-going.*
 - Current Status *construct next summer hopefully.*
3. Groundwater Remediation
 - Air Sparge / Vapor Extraction
 - Groundwater Extraction
 - Groundwater Model
 - Seasonal Irrigation
 - Air Sparge / Infiltration
 - Recommendations
4. Report
5. Miscellaneous Items

THE UNIVERSITY OF CHICAGO



YMCA Gas Extraction System

054080072HELA960311\A_PPT\05496001.PPT

Hydrometrics, Inc.
Consulting Scientists, Engineers, and Contractors



GROUNDWATER CORRECTIVE MEASURES ALTERNATIVES

1. Existing Corrective Action with provisions for temporary carbon canisters on impacted domestic wells.
2. In-situ Air Sparging
3. In-situ Air Sparging / Vapor Extraction
4. Groundwater Extraction / Seasonal Irrigation
5. Groundwater Extraction / Seasonal Irrigation / Seasonal Discharge to POTW
6. Groundwater Extraction / Air Stripping / Infiltration



GROUNDWATER CORRECTIVE MEASURES ALTERNATIVES

1. Existing Corrective Action with provisions for temporary carbon canisters on impacted domestic wells.

2. In-situ Air Sparging

3. In-situ Air Sparging / Vapor Extraction

4. Groundwater Extraction / Seasonal Injection

5. Groundwater Extraction / Seasonal Injection / Seasonal Discharge to POTW

6. Groundwater Extraction / Air Sparging / Injection



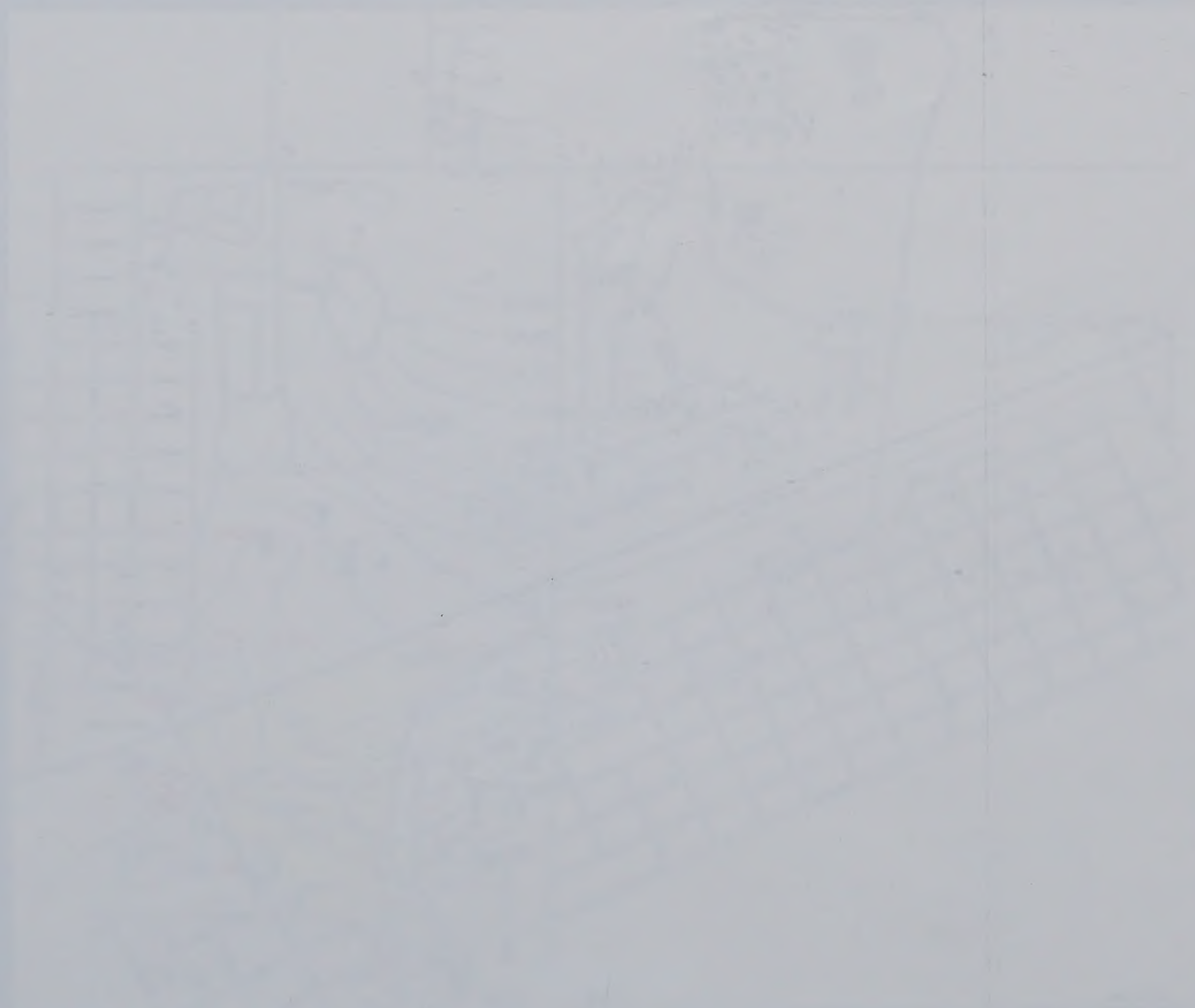
VOC Detection Locations and Frequency



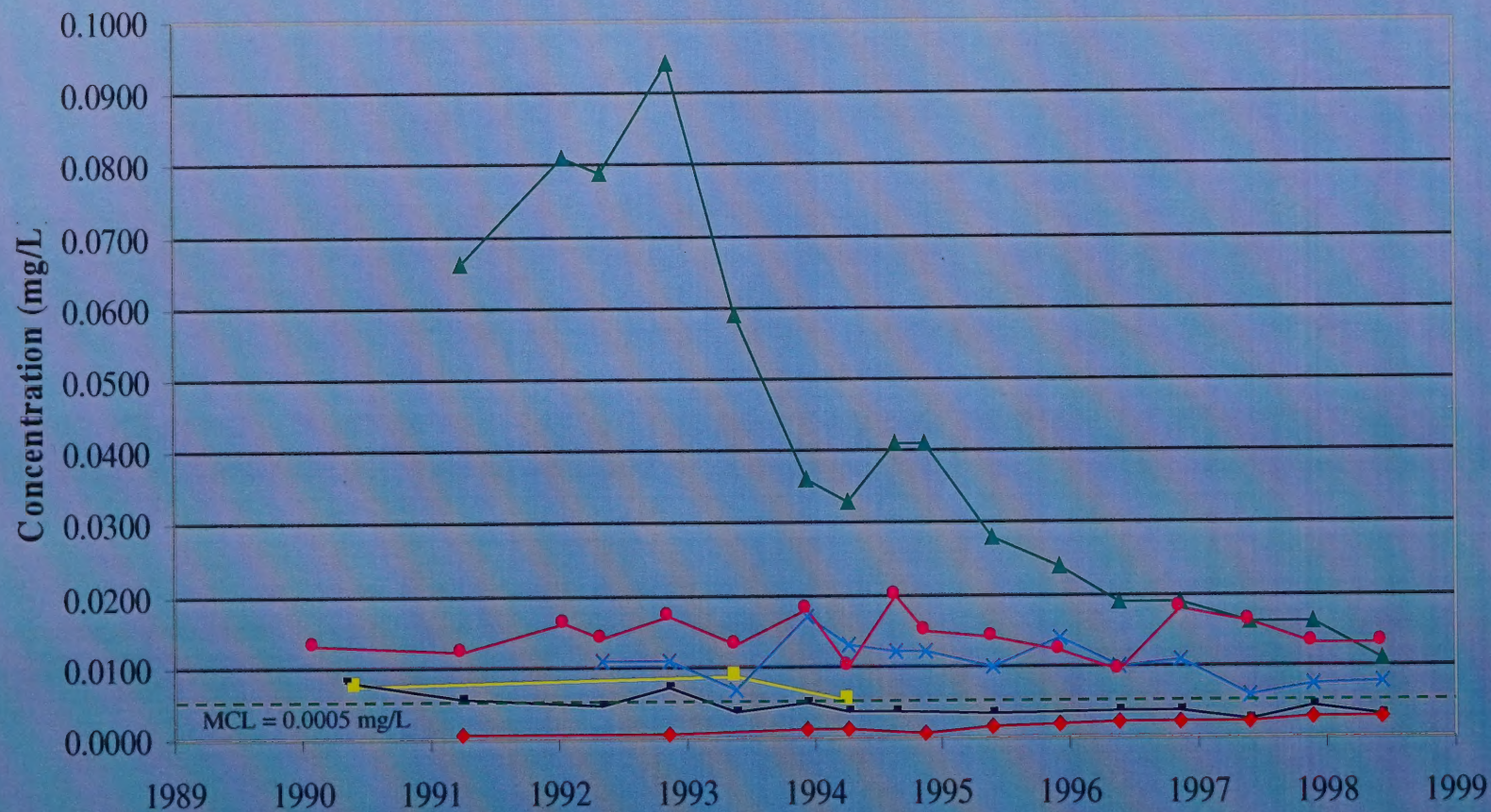
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Consulting Scientists, Engineers, and Contractors





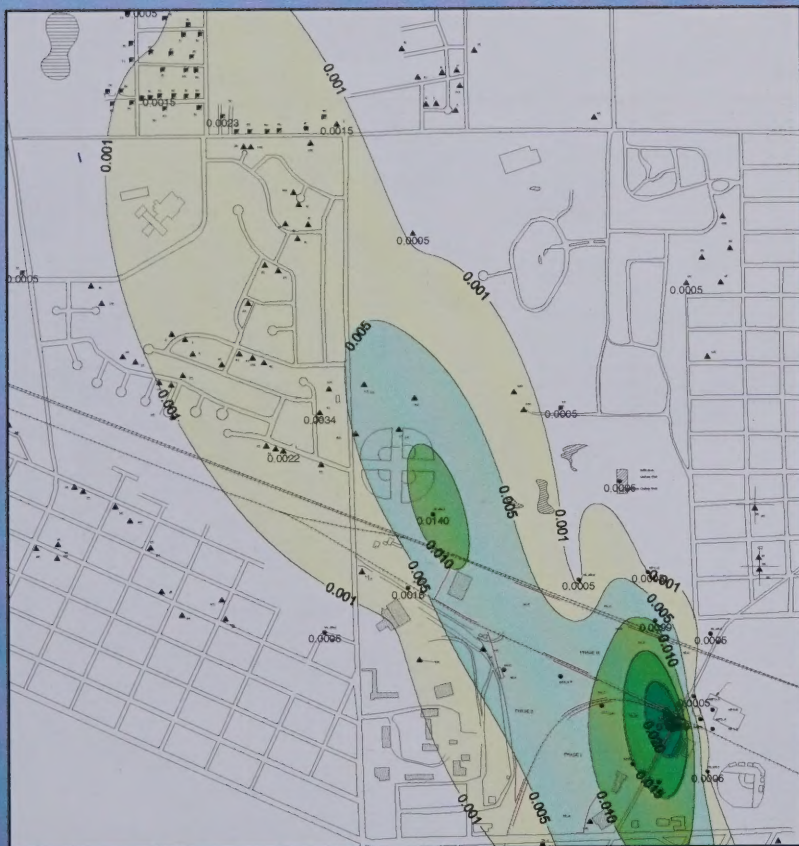
Temporal Concentration Trends for Tetrachloroethene



28 EPA-1 MPC-1 HL-90-1 40 5







May 1995 Data



June 1998 Data

Groundwater Perchloroethylene Concentrations

Notes:

- (1) All concentrations in mg/L.
- (2) Data below detection limits (<0.001 mg/L) shown and contoured as 0.005 mg/L.





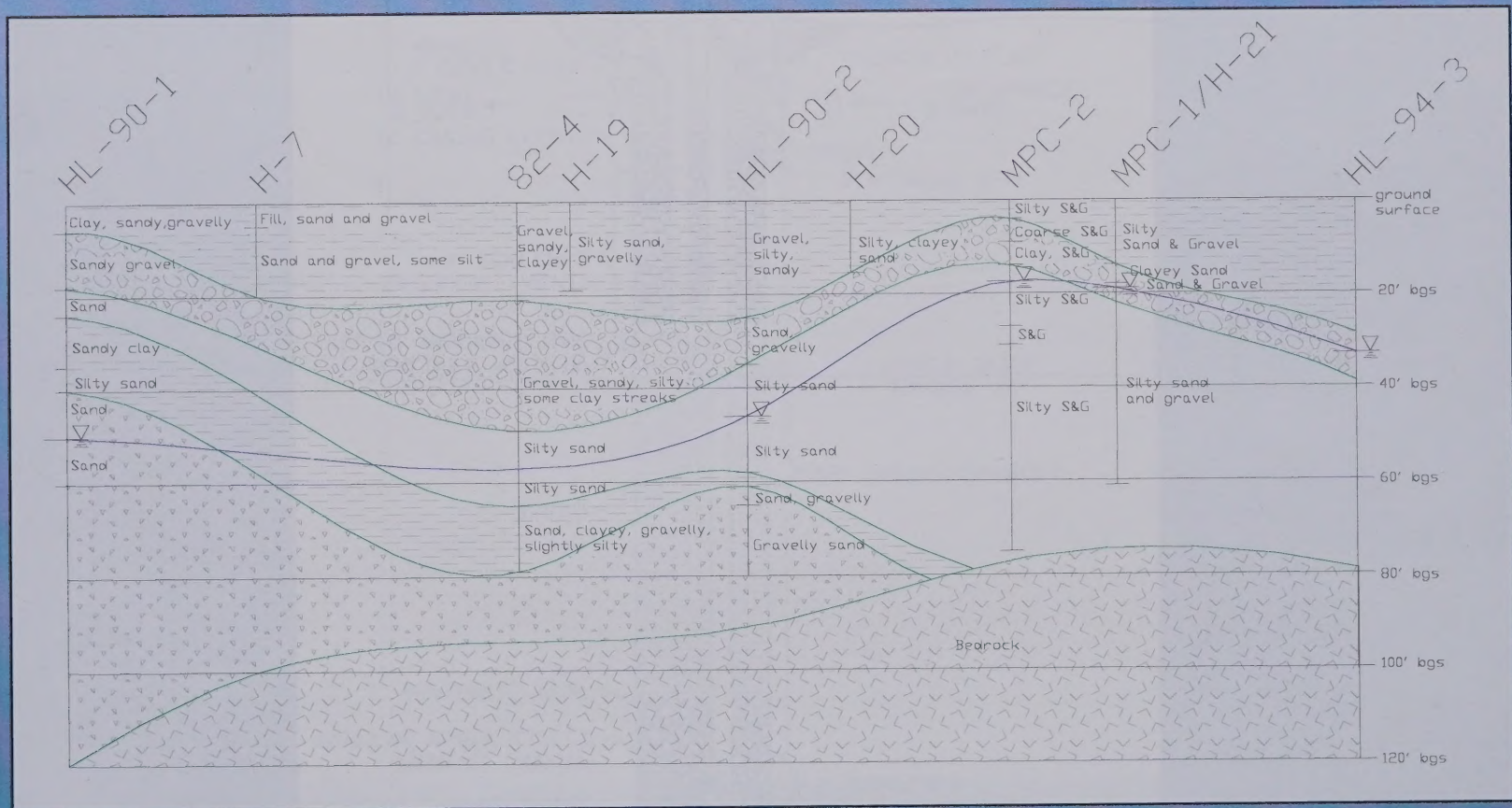
Volatile Organic Compound	Henry's Law Constant* (atm*m³/mol)	Vapor Pressure** (mm Hg)
1,1,1-Trichloroethane	1.5E-02	100
1,1-Dichloroethane	5.9E-03	180
1,2-Dichloropropane	2.8E-03	
Bromodichloromethane	2.5E-03	
Carbon Disulfide	1.8E-02	
Chloroform	4.1E-03	160
Cis-1,2-Dichloroethene	7.4E-03	200
Cis-1,3-Dichloropropene	2.4E-03	
Dichlorodifluoromethane	2.6E-03	608
Methylene Chloride	2.5E-03	349
Tetrachloroethene	2.7E-02	14
Trichloroethene	1.2E-02	60
Trichlorofluoromethane	2.1E-03	15

*The Henry's Law Constant is an indicator of a chemical's stripability (whether or not sparging will be effective in reducing dissolved contamination). A constant of greater than 10^{-5} indicates a stripable compound.

**Vapor pressure is an indicator of a chemical's volatility (how effective air sparging will be in treating adsorbed phase contamination). A value greater than 1 indicates a compound that is sufficiently volatile to be removed by sparging.







Cross-Section of Potential Air Sparging Line

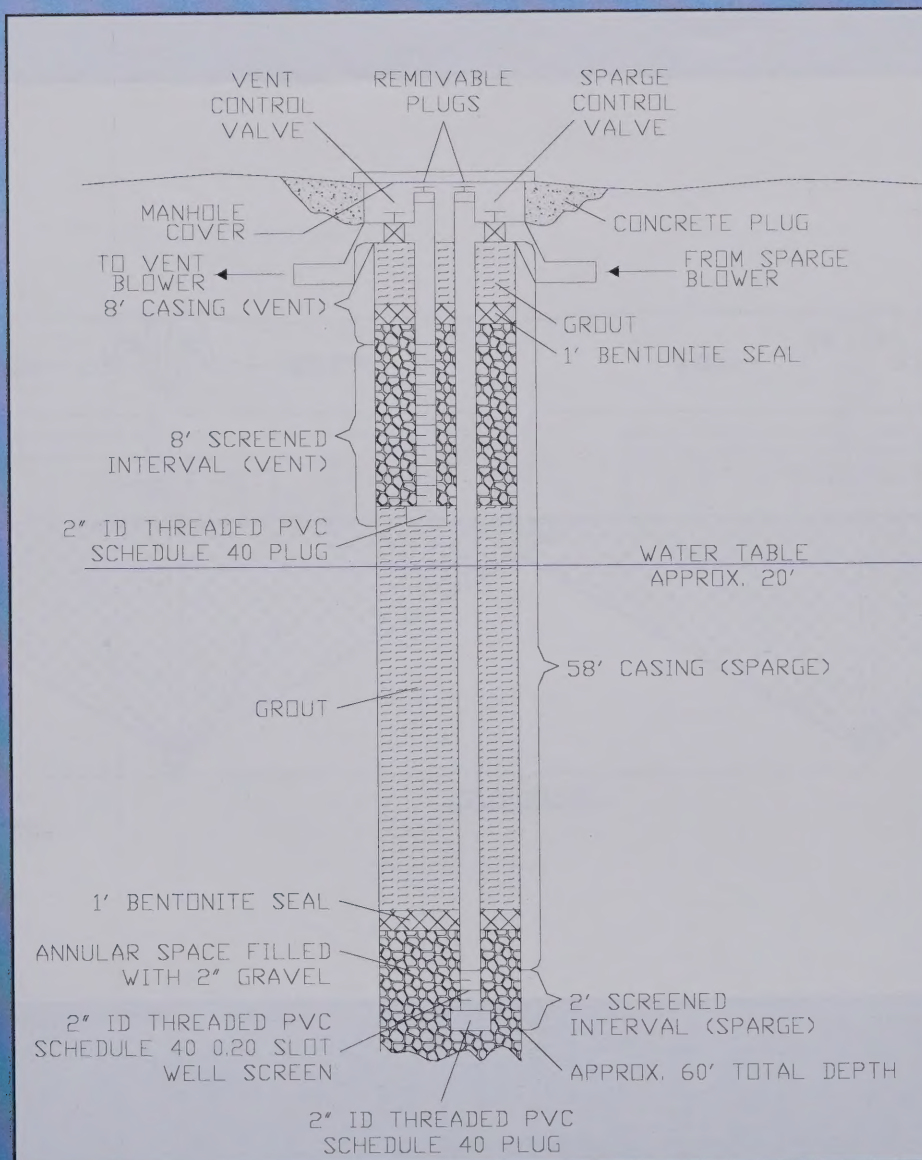
10:1 Vertical Exaggeration



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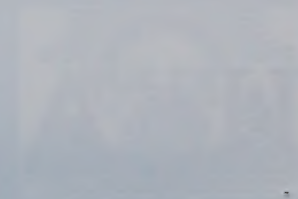
Hydrometrics, Inc.
Consulting Scientists, Engineers, and Contractors

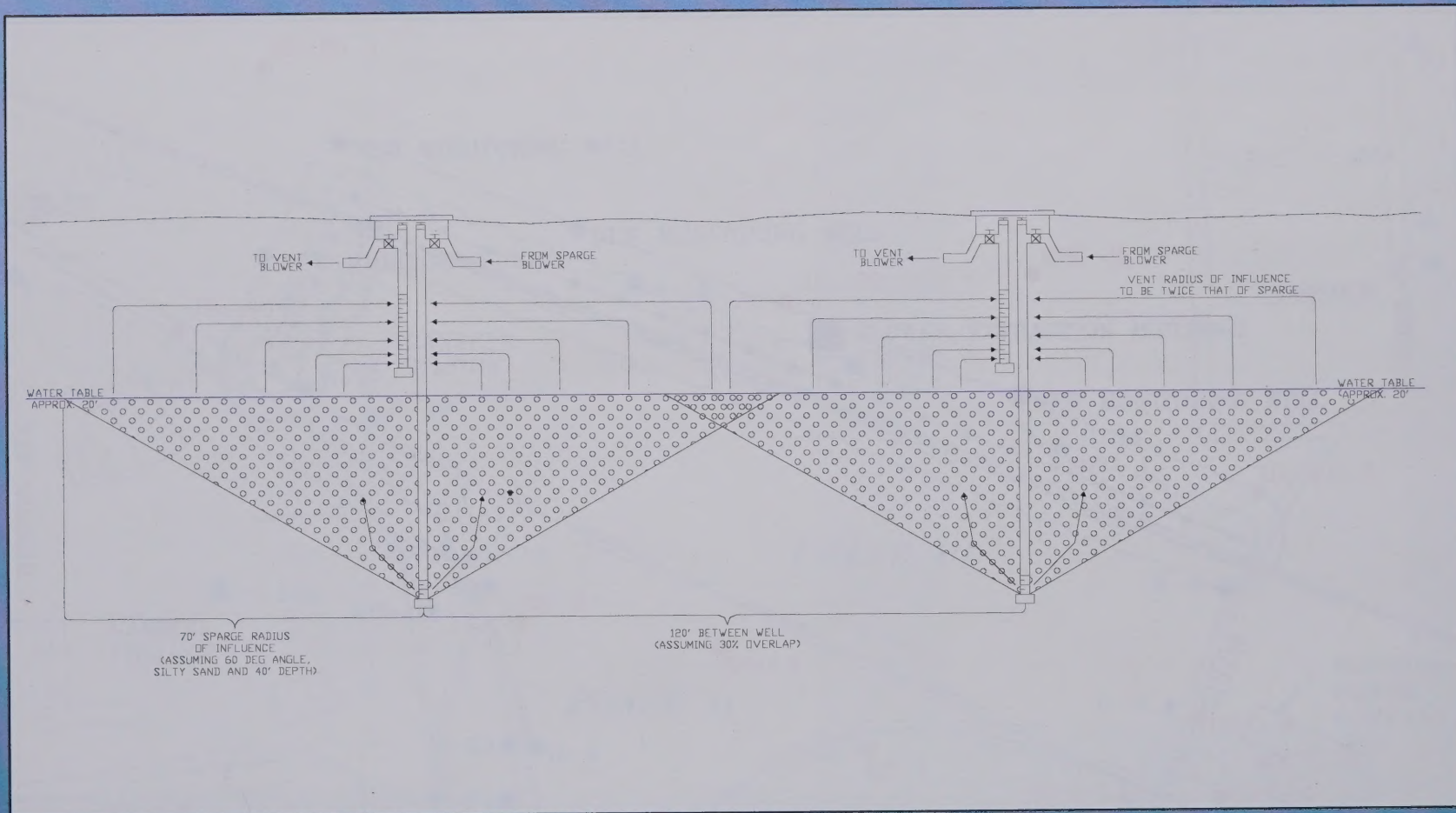




Typical Air Sparge/Vent Point Construction
(Not To Scale)







Design Parameters And Assumptions For Air Sparge/vent System

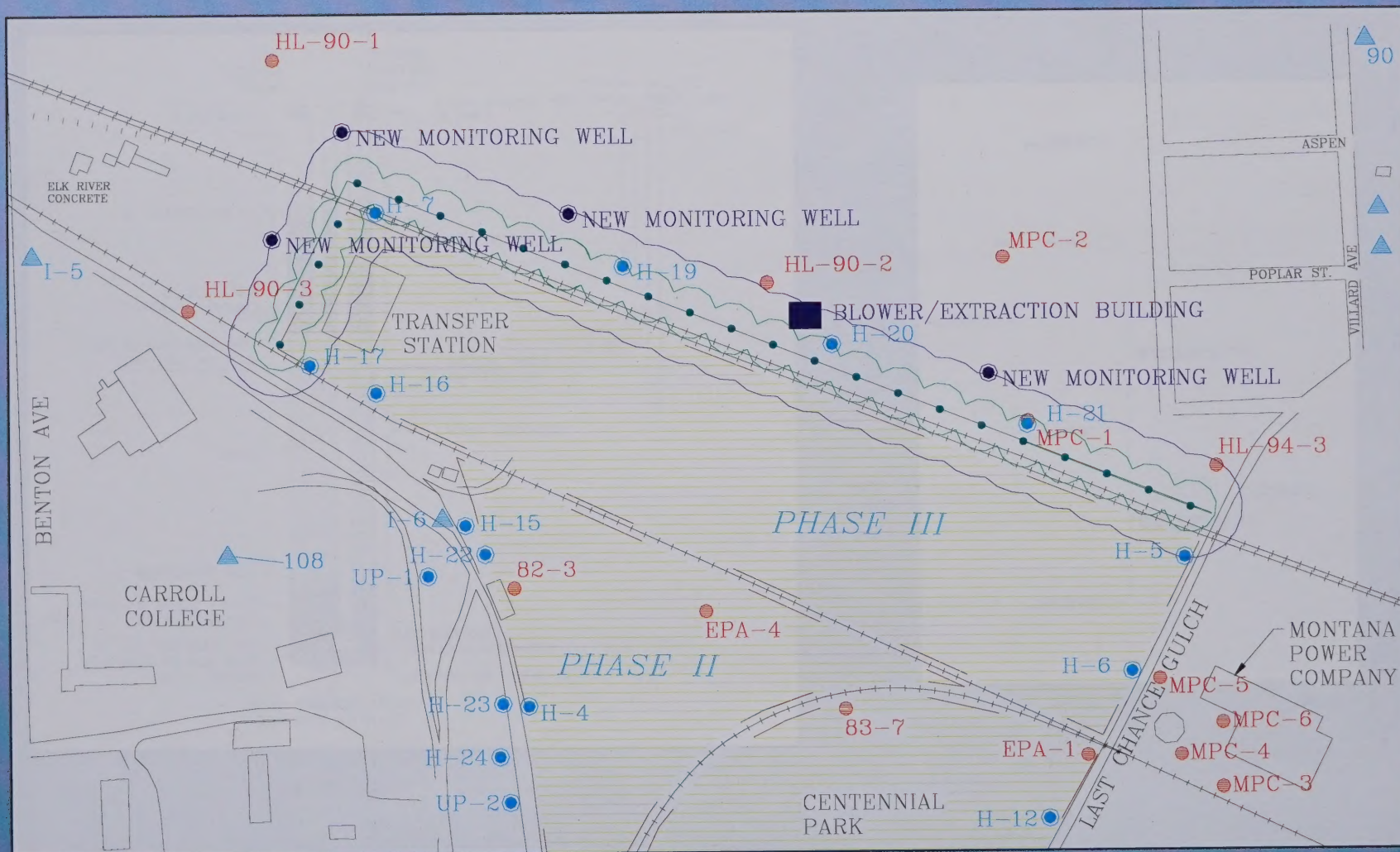
(Not To Scale)



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Hydrometrics, Inc.
Consulting Scientists, Engineers, and Contractors

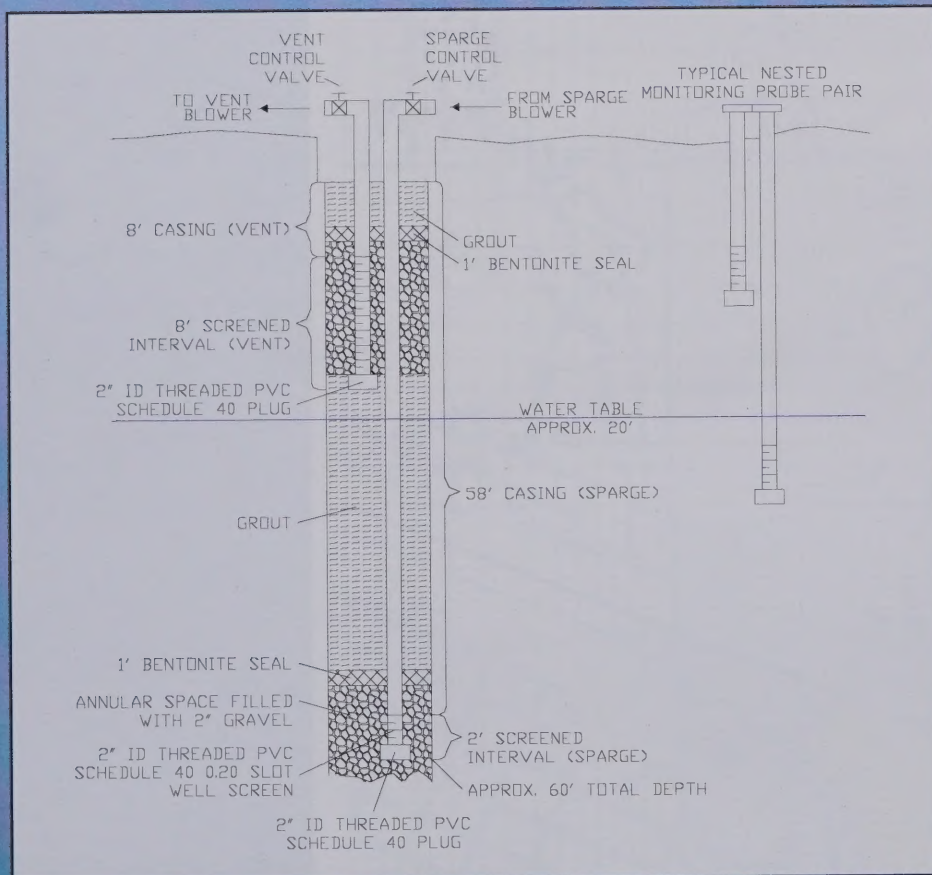




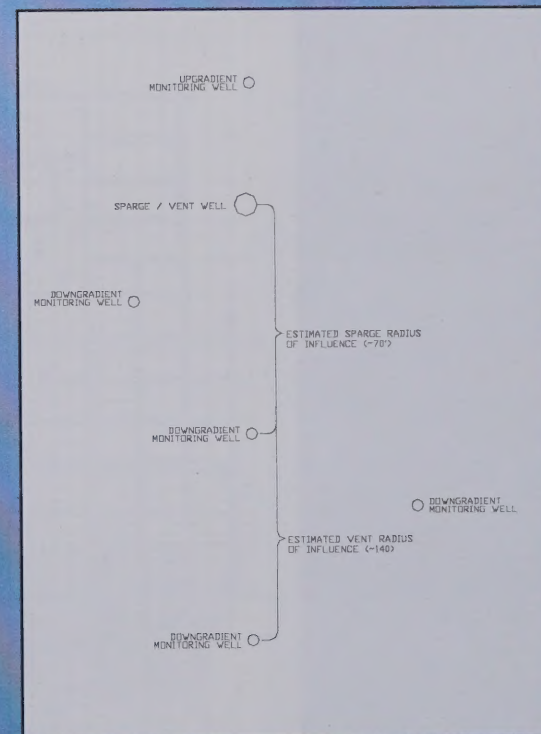
Preliminary Air Sparge / Soil Venting Design

Includes: 25 combination sparge/vent wells
 Blower capable of 375 cfm at 500+ psig
 Vacuum capable of 750 cfm

Hydrometrics, Inc.
 Consulting Scientists, Engineers, and Contractors



Well Construction



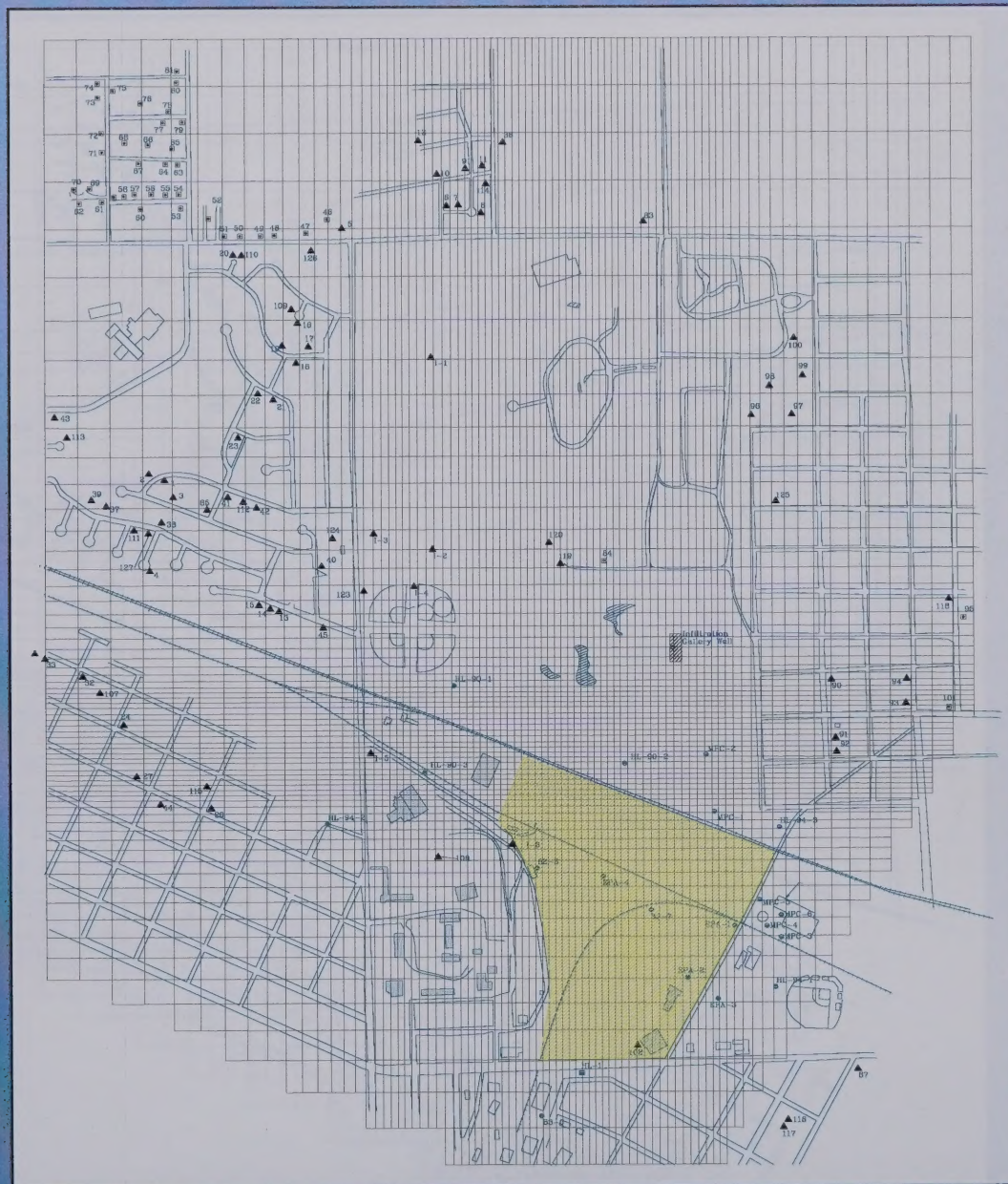
Test Lay Out

Sparge / Vent Field Test Set-up

Field test well to be placed near monitoring well HL-90-2.

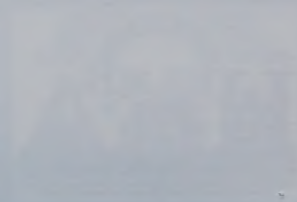




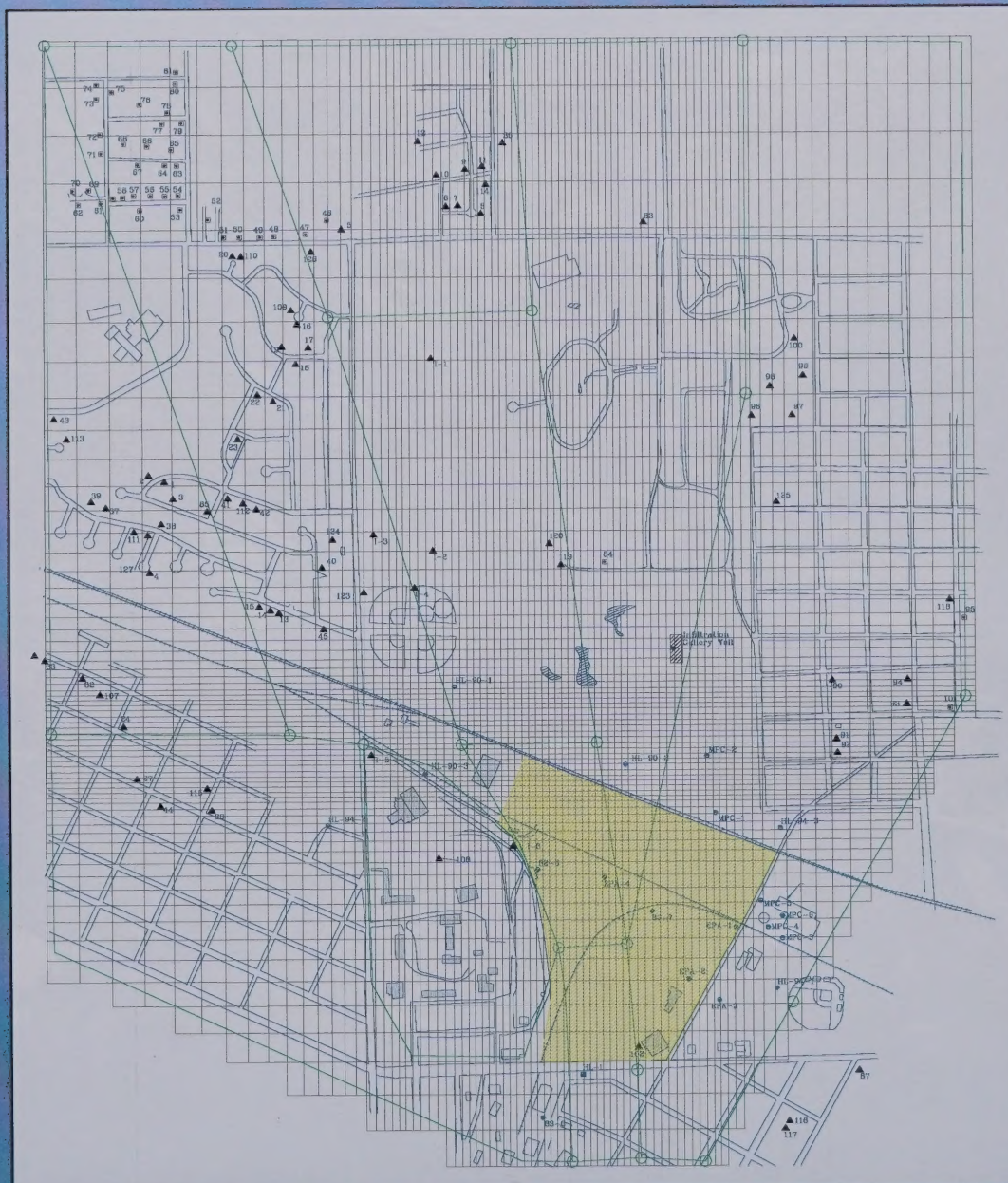


Model Grid









Assignment of Model Parameters



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Consulting Scientists, Engineers, and Contractors





Stormwater Drain Infiltration Point



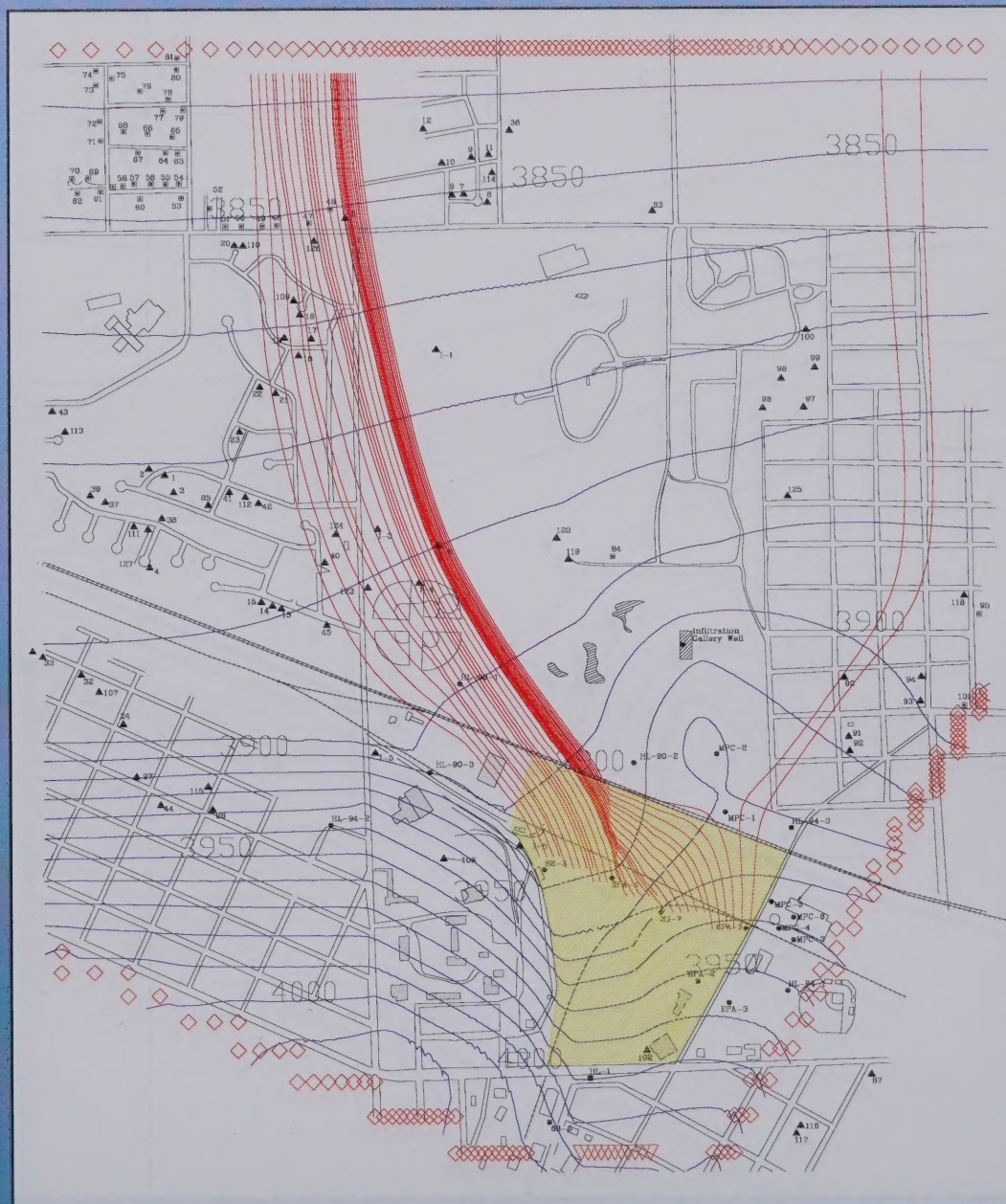




Stormwater Drain Outfall







Groundwater Flow Paths

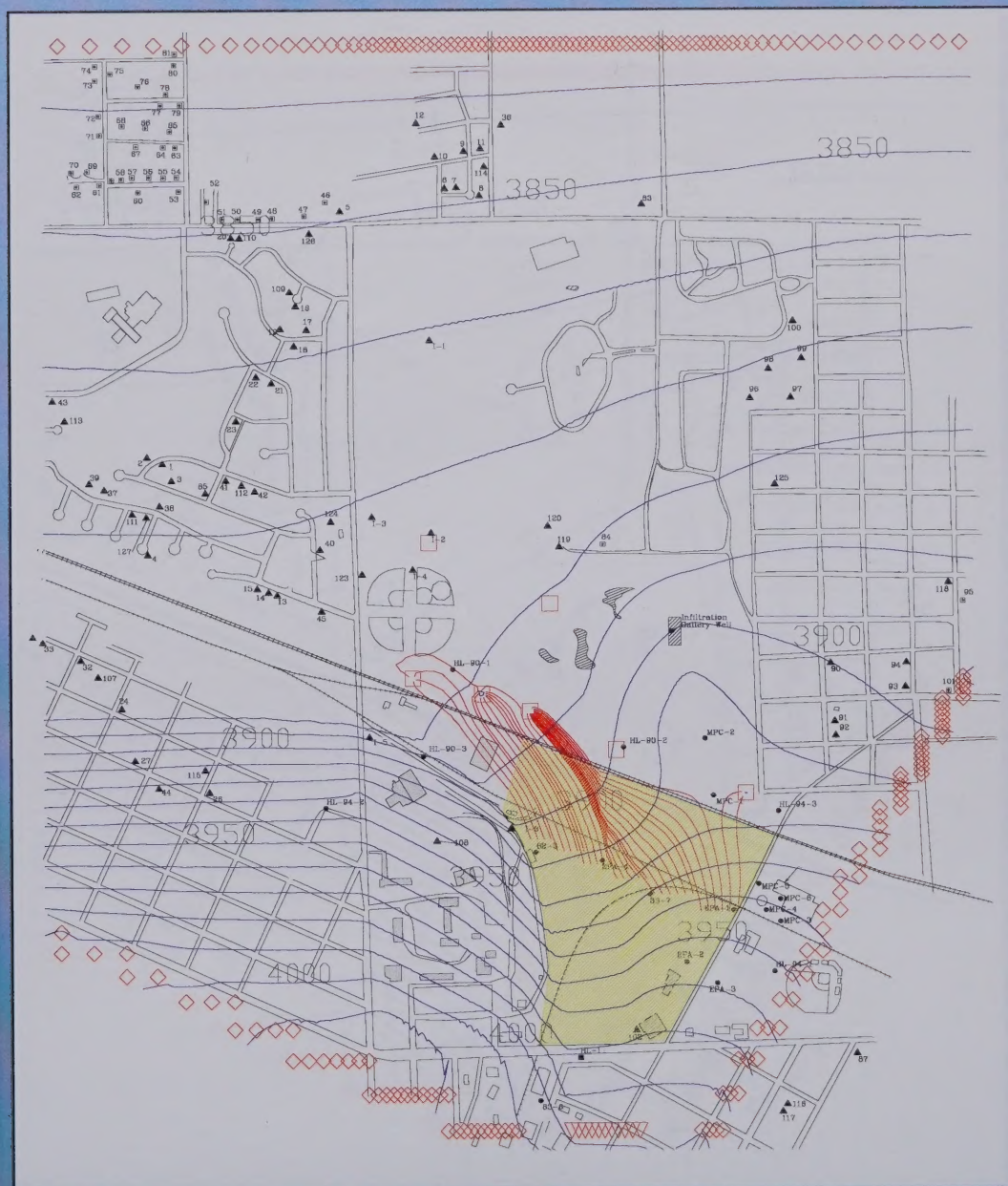




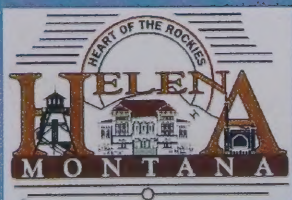


Pumping Well Locations





Steady State Capture Scenario



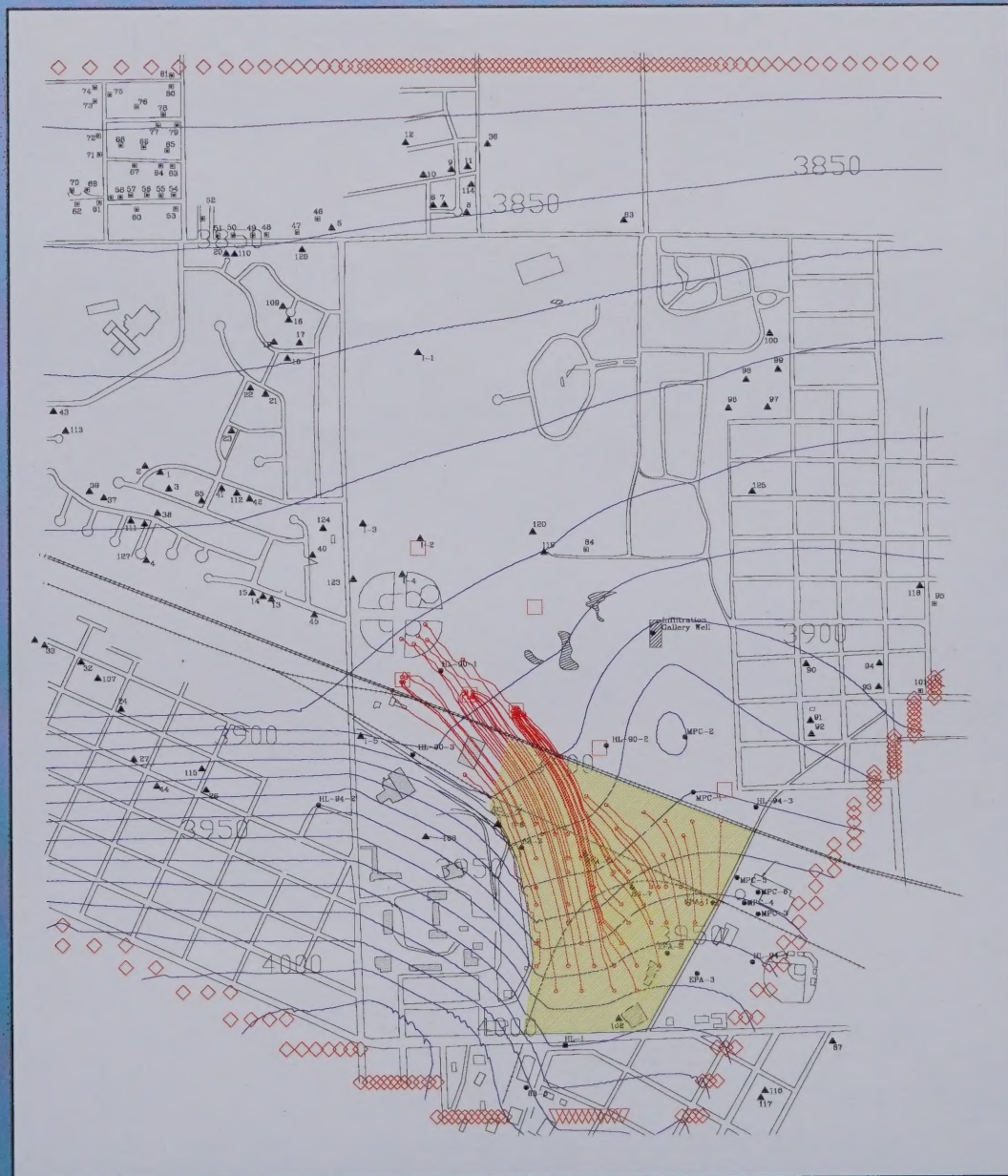
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Hydrometrics, Inc.
Consulting Scientists, Engineers, and Contractors





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180 Day Pumping Scenario

Hydrometrics, Inc.

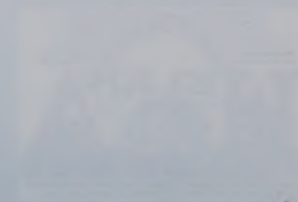
Consulting Scientists, Engineers, and Contractors





054080072\HELV96031\VA_PPT\05496001.PPT

Hydrometrics, Inc.
Consulting Scientists, Engineers, and Contractors



Evaluation Criteria	Alternative 1 Existing Corrective Action	Alternative 2 In-Situ Air Sparging	Alternative 3 In-Situ Air Sparging / Soil Gas Extraction	Alternative 4 Extraction/ Irrigation	Alternative 5 Extraction/ Irrigation/ Seasonal Treatment at POTW
Reliability	⊙	⊙	⊙	⊙	⊙
Ease of Implementation	●	●	●	⊙	⊙
Potential Impacts	None	Mobilization of other substances	Mobilization of other substances	Consumptive water use/ exposure during spraying	Consumptive water use/ VOC load on POTW
Time Frames (years)	Implement - 0 Reach goals - 15 Monitor - 30	Implement - 1 Reach goals - 15 Operate - 30	Implement - 1 Reach goals - 15 Operate - 30	Implement - 1 Reach goals - 15 Operate - 30	Implement - 1 Reach goals - 15 Operate - 30
Costs:					
Pilot Test	-	\$13,000	\$18,000	\$27,000	\$27,000
Installation	\$507,000	\$192,000	\$280,000	\$135,000	\$178,000
Annual O&M	\$33,000	\$60,000	\$65,000	\$50,000	\$55,000

- Meets criterion
- ⊙ Has potential to meet criterion

POTW Publicly owned treatment works

Comparison of Alternatives



County L & C

Facility & # Helena 90

Closure

Landfarm

Finan Assur

Liner

GW Corr Meas

Methane

GW Monitoring

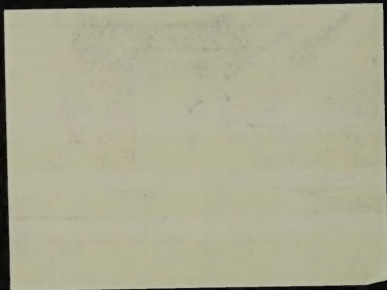
O & M

GW Reports

Run - On

Inspections

Other: _____





Hydrometrics, Inc.

consulting scientists, engineers & contractors

File: L+C Co
City of Helena (Inactive)
gnd wtr (Corresp) +
2727 Airport Road Corr.
Helena, MT 59601 M. ew.
(406) 443-4150
Fax: (406) 443-4155 or
(406) 443-1252
www.hydrometrics.com

September 30, 1998

Pat P
RECEIVED

OCT 01 1998

Kim Milburn
Public Works Director
City of Helena
316 North Park Ave.
Helena, MT 59623

MONTANA
DEPT. OF ENVIRONMENTAL QUALITY
COMMUNITY SERVICES BUREAU

RE: Minutes of 9/22/98 City of Helena Landfill Methane and Groundwater Remediation Meeting

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Mike Wignot, Hydrometrics, Inc.
Jodi Bingham, Hydrometrics, Inc.

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Department of the Interior
Bureau of Land Management
Washington, D. C. 20246

June 1, 1964

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Exhaustion System (See Attachment)

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Exhaustion System (See Attachment)

- The City has been working with the College to try to resolve their differences. In a meeting with Lynn Bickel and Tom McQuinn, a verbal agreement was reached in which the City would remain all the buildings currently owned by the College would remain in the City's ownership. The City will not be involved with the buildings that are not owned by the City.
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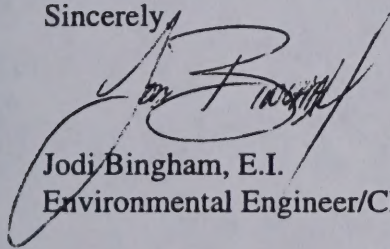
- Alternatives for groundwater remediation included seasonal irrigation and air sparging.
- Pat Potts suggested the City (Hydrometrics) began modeling the groundwater and investigating the irrigation alternative.
- The state has GMS (version of Modflow) and would like the input files to double check Hydrometrics' modeling results.
- Pat Crowley stated that MDEQ was not likely to consider natural attenuation as a remediation alternative.

Schedule

- For compliance of YMCA gas extraction wells (bringing monitoring probes into compliance), Pat Potts thought the two-year period already agreed to was sufficient.
- For the Carroll College gas extraction system, the property issues should be settled and an alternative selected by the end of October with design and construction to be completed by next summer.
- For the groundwater remediation, the groundwater modeling for irrigation well installation and further investigation of the air sparging alternative should be completed by the end of October.
- Another meeting similar to this one was tentatively scheduled for the week of October 26th to discuss the progress on the Carroll College gas extraction system and to present the results of the groundwater modeling.

If you have any questions or comments concerning this summary, please feel free to call me.

Sincerely,



Jodi Bingham, E.I.
Environmental Engineer/Chemist

c: Ted Hill, City of Helena
Pat Potts, MDEQ
Pat Crowley, MDEQ
Ken Kapsi, MDEQ
Mike Wignot, Hydrometrics

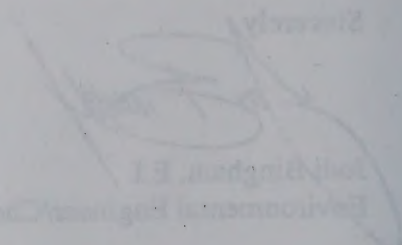
- Attention for groundwater remediation included several investigations and an ongoing.
- The team suggested the City (Hydrologist) began modeling the groundwater and monitoring the response the water.
- The team has also (review of Model) and would like the report filed in 1998.
- Check Hydrologist, ongoing results.
- For County, when that MDEQ was not likely to consider current situation as a remediation plan.

Summary

- For completion of YRCA, the extraction wells (hydrology monitoring) project into completion. The team thought the two-year period already agreed to was sufficient.
- For the County College, the extraction system, the property owner should be notified and an alternative selected by the end of October with design and construction to be completed by next summer.
- For the groundwater remediation, the groundwater modeling for nitrogen well, investigation and further investigation of the air quality alternative should be completed by the end of October.
- Another meeting similar to this one was tentatively scheduled for the week of October 19th to discuss the progress on the County College gas extraction system and to present the results of the groundwater modeling.

If you have any questions or comments concerning this summary, please feel free to call me.

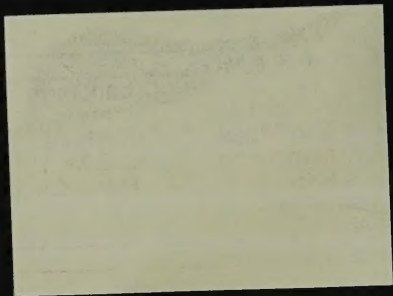
Sincerely,



Ted Hillman, E.I.
Environmental Engineering Consultant

- cc Ted Hill, E.I. of Hillman
- For Ted Hillman
- For County College
- For Kim Hillman
- For Weyerhaeuser

County L+C
Facility & # Helena 90
Closure Landfarm
Finan Assur Liner
GW Corr Meas Methane
GW Monitoring Camp O & M
GW Reports Run - On
Inspections
Other: _____



Helina 1. F
Ground water

1) 4 Sizing -
2 Cars in line consists, one currently.
Increasing volume gradually.
April start up last year. -

Increasing volume gradually.

April Start up last year.

~~→~~ Need to discuss licence boundary again

again.
New map being made, all wells,
all boundaries - soon -

If not Then what? - expand system.

27 Carroll College Cas. —

~~25~~ Add prices in 98.

Active / passive lived Trench. +

a) Property issues - Verbal agreement to

Acquire old I.F. area. —

Do this week by Kim.

3) Design this water

Budget - Should be good.

Budget - should be good.
Passive extraction trench/blower retrofit,
possible. —

3. Optic - irrigation wells. -

Both coarse irrigation wells.

Batch field, Carroll College.

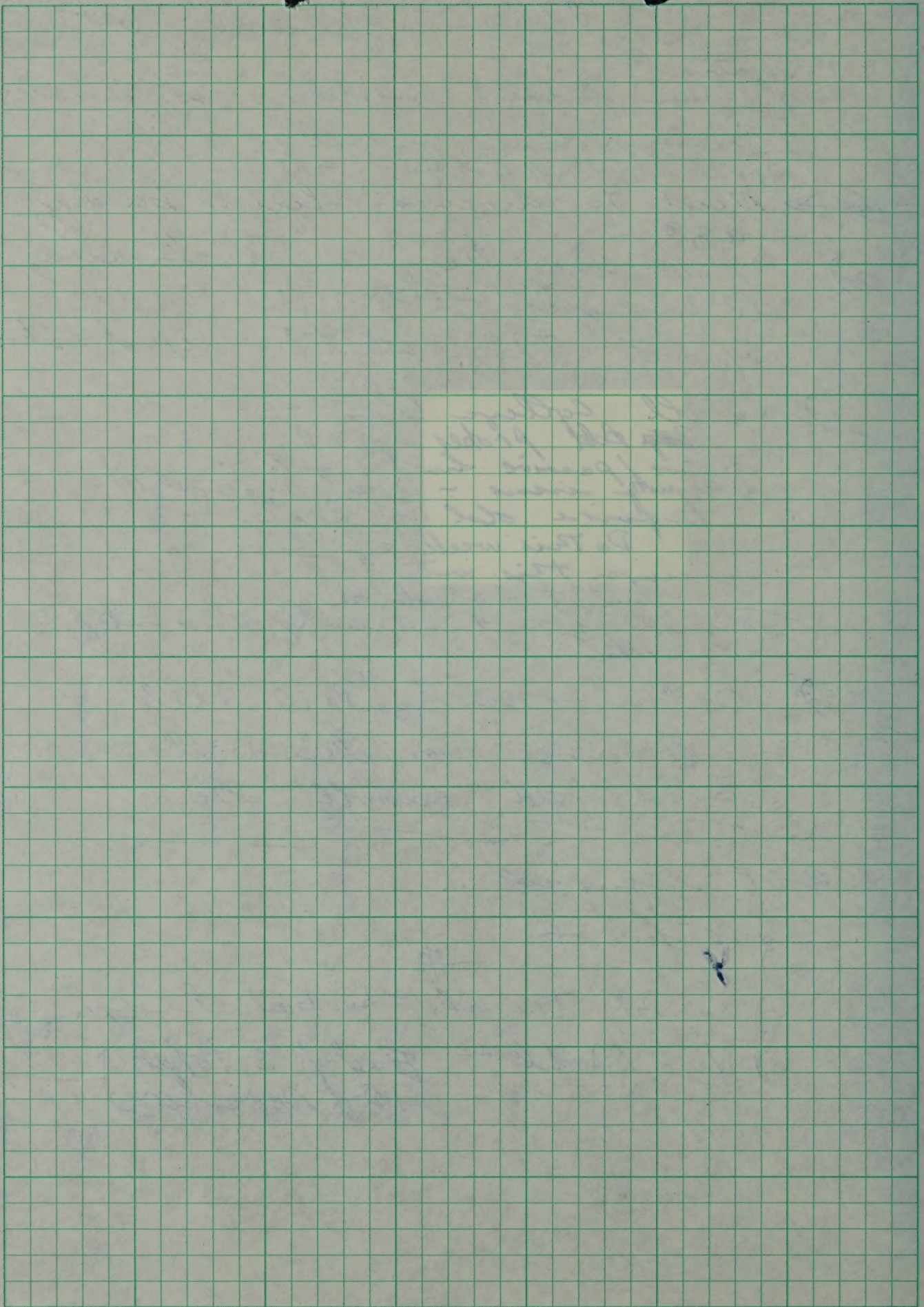
Model required %

Time line, t

~~Y~~ empirical - $\frac{0.9}{0.6}$

2.) Carroll Trench. - by frost out in Spring.

3.) New Model - End of October -
1st of November



CITY OF HELENA LANDFILL

MEETING AGENDA

SEPTEMBER 22, 1998

08:30-10:00

1. YMCA Gas Extraction System
 - Current Status
 - Future Actions
2. Carroll College Gas Extraction System
 - Proposed Options
 - Current Status
3. Groundwater Remediation
 - Natural Attenuation
 - Global Gas Extraction System
 - Irrigation Wells
4. Summary of Reporting Requirements
5. Miscellaneous Items

GENERAL INFORMATION

DATE OF BIRTH

DATE OF DEATH

DATE OF BURIAL

DATE OF INTERVIEW

DATE OF DEATH

DATE OF BURIAL

DATE OF INTERVIEW

DATE OF BURIAL

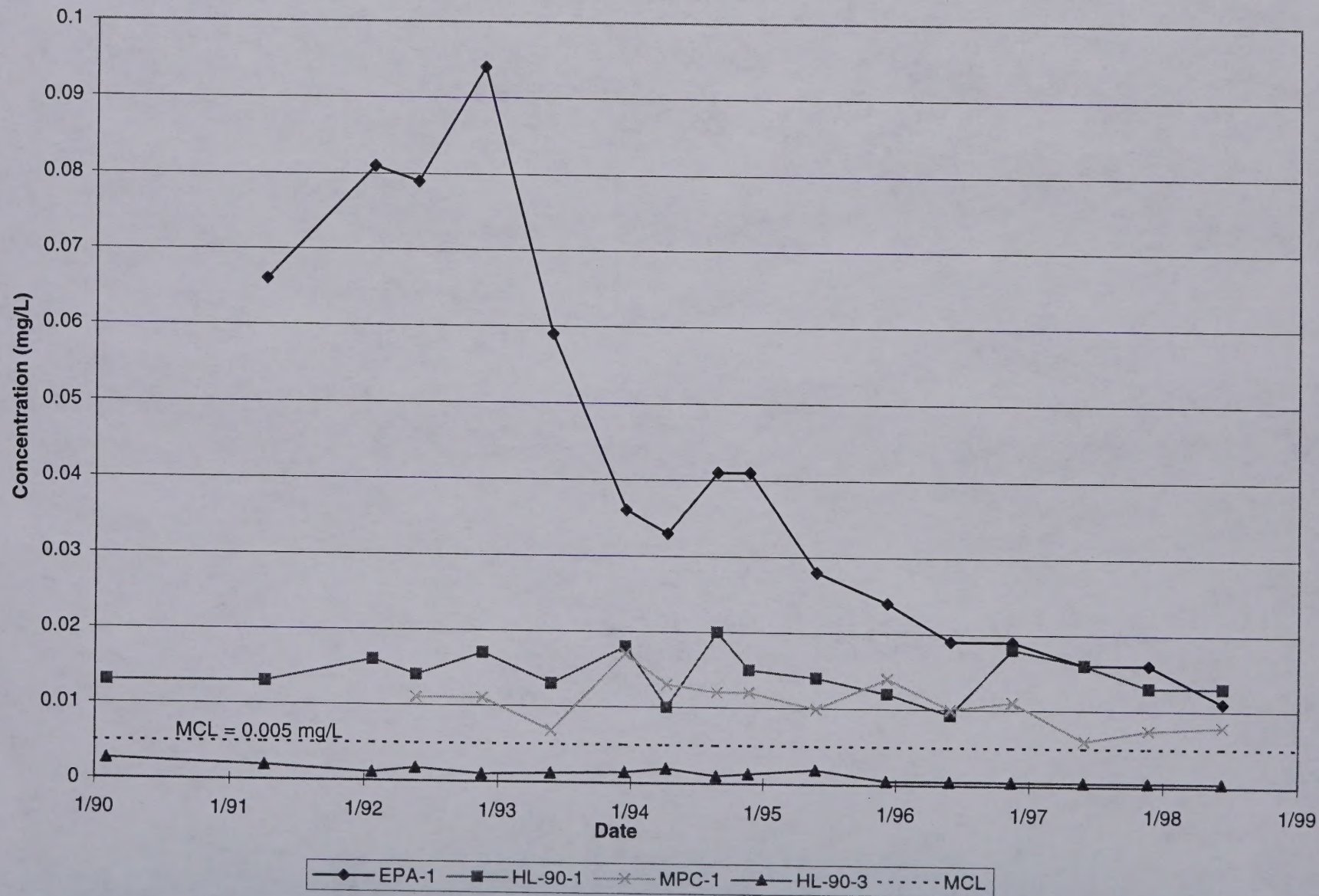
DATE OF DEATH

DATE OF BURIAL

DATE OF INTERVIEW

DATE OF BURIAL

TEMPORAL TRENDS IN TETRACHLOROETHENE CONCENTRATIONS AT VARIOUS DOWNGRADIENT WELLS



County Levi's + Clark

Facility & # City of Helena 90

Closure Landfarm

Finan Assur Liner

GW Corr Meas Methane

GW Monitoring O & M

GW Reports Run - On

Inspections

Other: _____

2-5

County _____
Locality & _____
Closure _____
Firm Assn _____
GW Con Meas _____
GW Monitor _____
GW Reports _____
Inspections _____
Other: _____

I N T E R

O F F I C E

MEMO

To: City of Helena Class II Landfill - Methane Monitoring Files
From: Jon Dilliard, Solid Waste Management Program JJ
Subject: YMCA Methane Monitoring
Date: November 22, 1996

This afternoon (11/22/96) I received a message to call the City of Helena. When I did, I was informed that the YMCA methane monitoring was having some trouble and I should call Fritz at 442-9622. When I contacted Fritz at the YMCA he informed me that they were getting 300 ppm methane readings in the building by the pool area and 90 ppm readings in the offices by the ventilation system. They have never had any readings in the office area before. He also indicated that they were getting a definite foul odor with the gas. After discussing the situation Fritz suggested that we shut down the ventilation system and see what happens. I agreed and asked that he call me with the second readings when he got them later in the afternoon.

When Fritz called back at around 4:30 p.m., he indicated that the readings in the pool area had dropped to 200 ppm and the office area was down to 20 ppm. Neither Fritz nor myself could come up any logical explanation why the reading would be higher with the ventilation system on and lower when it was off. Fritz asked whether to turn the system back on or leave it off. I suggested that the system be left off for the night and the building rechecked in the morning. Fritz agreed and I gave him my home phone number to contact me.

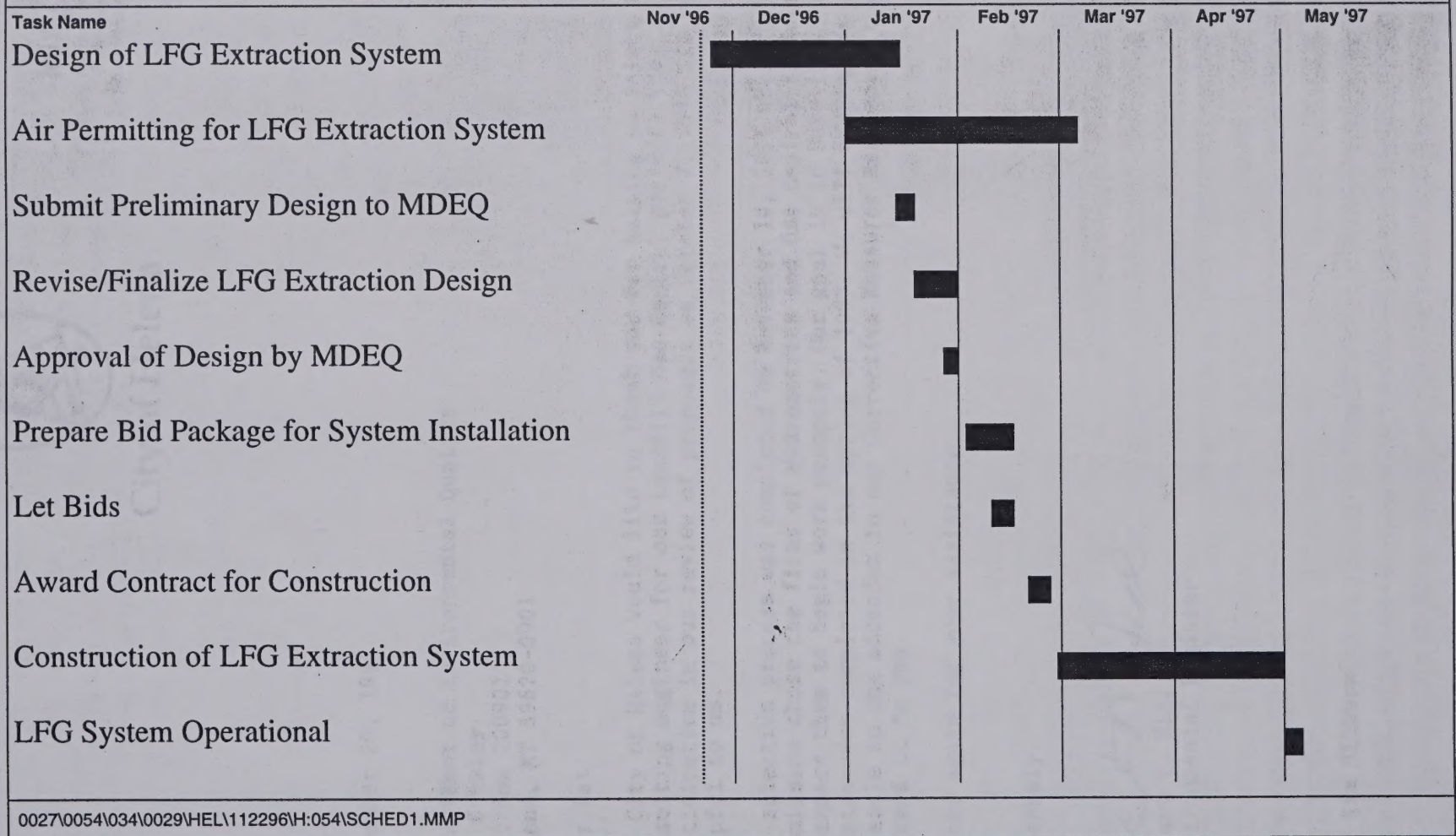
of experiment is by the use of a
new generation of computers. A
new generation of computers is
now being developed by the
U.S. Army Research Office-Durham
which will be able to handle
the large amount of data
generated by the experiments.

RECEIVED

NOV 22 1996

Montana Department of
Environmental Quality
Waste Management Division

CITY OF HELENA LANDFILL -- PROPOSED TIME SCHEDULE





City of Helena

RECEIVED

NOV 22 1996

Montana Department of
Environmental Quality
Waste Management Division

November 20, 1996

Department of Environmental Quality
Pat Crowley
P.O. Box 200901
Helena, MT 59620-0901

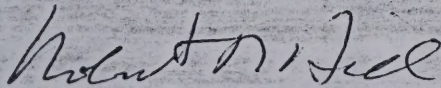
Dear Pat:

The City of Helena would like to thank you for helping us select a consulting engineer for our Landfill Gas Control project. Your participation in our review of proposals on October 2, 1996 was very helpful to us.

Our selection process was completed on November 18, 1996 when the City Commission chose the firms of Hydrometrics and Gas Control Engineering. We expect them to begin work promptly. Our goal is to have the construction completed in the spring of 1997. We will update the schedule in the addendum to our Corrective Measures Assessment soon and forward it to you.

Thanks again for your assistance.

Sincerely,


Robert T. Hill
Environmental Engineer

c: Kim Milburn

RECEIVED
NOV 2 1986
City of Helena
Environmental Services
Department



City of Helena

November 20, 1986

Department of Environmental Quality
Pat Crowley
P.O. Box 200001
Helena, MT 59620-0001

Dear Pat:

The City of Helena would like to thank you for helping us select a consulting engineer for our landfill gas control project. Your participation in our review of proposals on October 7, 1986 was very helpful to us.

Our selection process was completed on November 18, 1986 when the City Commission chose the firm of Hydrocarbon and Gas Control Inc. We expect them to begin work shortly. Our goal is to have the construction completed in the spring of 1987. We will update the schedule in the abstract to our corrective measures statement soon and forward it to you.

Thank you for your assistance.

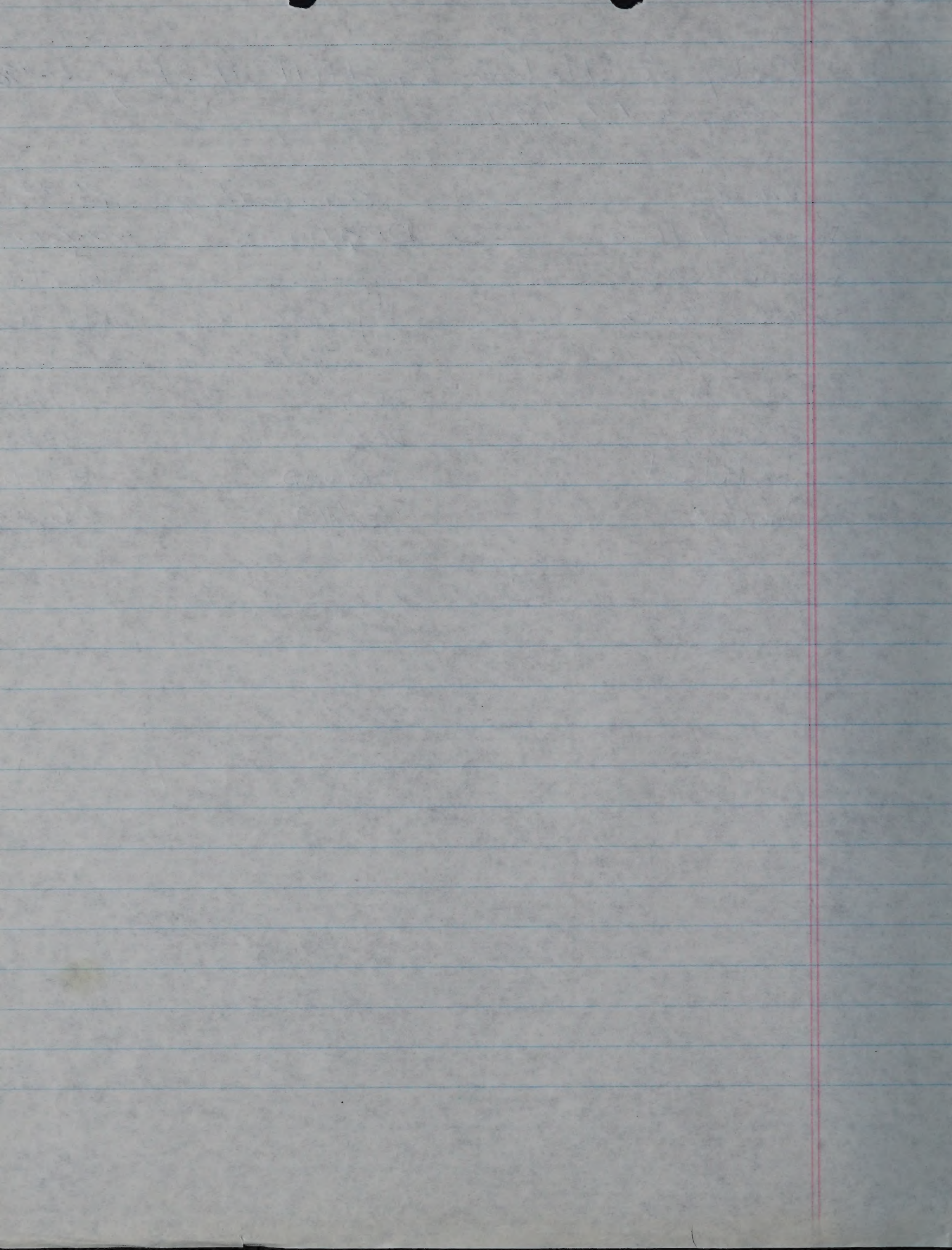
Sincerely,

Robert T. Hill
Robert T. Hill
Environmental Engineer

cc: Jim Miller

City of Helena Landfill Meeting - Lic#90 March 19, 1996

<u>Name</u>	<u>Representing</u>	<u>Ph.#</u>
James Wilbur	DEQ/WMD	444-1430
Kim Milbarn	City of Helena	447-8426
Steve Downs	Hydrometrics	443-4150
Ted Hill	City of Helena	447-1575
Pat Potts	DEQ	4-1430
Pat Crowley	DEQ	-1430
Jon Dilliard	DEQ/WMD	444-1430
Dave Klemp	DEQ/ADD	444-3454



Initials

Date

2/21/96

SOLID WASTE PROGRAM ROUTE SLIP☐ NEW APPLICATION

Initial / Date

Jim W.
Jon D.
Proof
Cathy
Roger

☐ NEW LICENSE

Initial / Date

Jim W.
Jon D.
Proof
Carol
Cathy
Roger

☐ HEALTH OFFICER CARD

Initial / Date

Jim W.
Carol
Cathy

☐ INSPECTIONS

Initial / Date

Pat C.
Jon D.
Proof
Carol
Roger

☐ INTERIM CLOSURES

Initial / Date

Jim W.
Jon D.
Proof
Carol
Cathy
Roger

☐ CLOSURES

Initial / Date

Jim W.
Jon D.
Proof
Carol
Cathy
Roger

☐ CHANGE IN LICENSE
FOR FEE STATUS

Initial / Date

Jim W.
Jon D.
Proof
Cathy
Roger

☐ COMPLAINTS

Initial / Date

Pat C.
Jon D.
Proof
Roger
Carol (filing & DBase)

☐ GENERAL CORRESPONDENCE

Initial / Date

Pat C./Jim W.
Jon D.
Proof
Roger

☒ MISCELLANEOUS

Initial / Date

Proof
Pat C
Jon D
Roger T
Mail

Tom 2-22-96
FRC 2/22/96
JD 2/22/96
PCK
2-23-96 - Tom

Sw/L+C Mel. add

Lewis & Clark Co
Melena #90



DEPARTMENT OF
ENVIRONMENTAL QUALITY

Waste Management Division
Solid Waste Program
406/444-1430

FAX # (406) 444-1499



STATE OF MONTANA

OFFICE LOCATION: 2209 PHOENIX AVE.
HELENA, MONTANA

MAILING ADDRESS: PO BOX 200901
HELENA, MT 59620-0901

February 23, 1996

Ted Hill
City of Helena
316 North Park
Helena, Montana 59623

RE: CITY OF HELENA CLASS II LANDFILL - LICENSE NO. 90
GROUND WATER - REVIEW OF THE ADDENDUM TO THE CORRECTIVE
MEASURES ASSESSMENT FOR THE HELENA LANDFILL

Dear Mr. Hill:

The "Addendum to the Corrective Measures Assessment for the Helena Landfill" was received on February 13, 1996. It has undergone preliminary review. The Program has determined that the Corrective Measures Assessment (CMA) with the addendum meets the requirements of ARM 16.14.708(6)(c) [recodified as ARM 17.50.710(6)(c)].

A public meeting will need to be scheduled by the City of Helena. According to ARM 16.14.708(6)(d) [recodified as ARM 17.50.708(6)(d)]:

"The owner or operator must discuss the results of the corrective measures assessment, prior to the selection of the remedy, in a public meeting with interested and affected parties."

Please notify the Program of the date, time, and location of this public meeting so that representatives of the Program may be present.

Following the public meeting and selection of a final remedy, the Program will review the remedy for compliance with the requirements of ARM 16.14.708(7) [recodified as ARM 17.50.710(7)].

Sincerely,

Pat Potts
Pat Potts

Environmental Specialist

cc: Steve Downs, Hydrometrics, Inc., 2727 Airport Road, Helena, MT 59601
Kim Milburn, City of Helena, 316 North Park Avenue, Helena, MT 59623
Bill Verwolf, City of Helena Manager, 316 N. Park Ave., Helena, MT 59623
Vivian Drake, City-County Building, 316 North Park Ave., P.O. Box 1723, Helena, MT 59624

path: sw\l&chel.add file: Lewis and Clark Co./City of Helena/grd wtr (corr)

File: Lewis & Clark Co.
City of Helena (inactive)
grdwtr (ANALY.) - summary
RECEIVED

FEB 13 1996

Montana Department of
Environmental Quality
Waste Management Division

ADDENDUM TO
CORRECTIVE MEASURES ASSESSMENT
FOR THE HELENA LANDFILL
HELENA MONTANA

Prepared for

Mr. Kim Milburn
Director of Public Works
CITY OF HELENA
Helena, MT 59601

Prepared by
HYDROMETRICS, INC.
2727 Airport Road
Helena, MT 59601

February 1996

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3.0 LANDFILL GAS EXTRACTION AND TREATMENT -----	3-1
4.0 SCHEDULE FOR IMPLEMENTATION OF CORRECTIVE ACTION ---	4-1

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ADDENDUM TO
CORRECTIVE MEASURES ASSESSMENT
FOR THE HELENA LANDFILL
CITY OF HELENA

1.0 INTRODUCTION

This addendum to the Corrective Measures Assessment (CMA) for the Helena Landfill has been prepared to present to the Montana Department of Environmental Quality (MDEQ) and to the public, proposed corrective actions which will be implemented by the City of Helena, in addition to those presented in the original CMA. Based on discussions with MDEQ and subsequent evaluation, the City of Helena proposes that the installation of a landfill gas (LFG) extraction system in the Centennial Park will provide water quality benefits beyond the alternatives presented in the CMA. The installation of this system was discussed in Section 5.2 of the CMA and will be further detailed in this addendum.

Section 2.0 of this addendum provides an evaluation and overview of 1995 water quality data collected at the site, to demonstrate current conditions at the site. Section 3.0 describes the proposed additional corrective actions, and Section 4.0 outlines the proposed schedule for implementation of the corrective actions.

ADDENDUM TO
CORRECTIVE MEASURES ASSESSMENT
FOR THE HELINA LANDFILL
CITY OF HELINA

1.2 INTRODUCTION

The addition to the Corrective Measures Assessment (CMA) for the Helina Landfill has been prepared as part of the Montana Department of Environmental Quality (MDHEQ) and the public. The purpose of this assessment is to provide information to the City of Helena in addition to that presented in the original CMA. Based on discussions with MDHEQ and subsequent evaluation, the City of Helena proposes that the installation of a landfill gas (LFG) collection system in the Central Part will provide water quality benefits beyond the standards presented in the CMA. The installation of this system was discussed in Section 3.2 of the CMA and will be further detailed in this addendum.

Section 3.2 of this addendum provides an evaluation and overview of 1995 water quality data collected at the site to demonstrate current conditions in the area. Section 3.3 describes the proposed additional corrective action, and Section 4.0 outlines the proposed schedule for implementation of the corrective action.

2.0 EVALUATION OF 1995 WATER QUALITY DATA

This section characterizes the current extent and degree of groundwater contamination present at and downgradient from the landfill site. Included are summaries of water quality data collected during 1995, as well as a potentiometric map and an iso-concentration contour map for tetrachloroethylene for data collected in December 1995. More detailed water quality information and a tabularized presentation of all of the data will be included in the 1995 Annual Water Resources Monitoring Report.

Figure 2-1 is a potentiometric contour map showing current groundwater flow directions. This map is similar to the map presented in the CMA, but also incorporates data from four new monitoring wells (MPC-3, MPC-4, MPC-5, MPC-6) installed by Montana Power Company just east of the landfill. The data from these wells is consistent with previous interpretations of groundwater flow in this area, and shows that there is not significant flow eastward from the landfill.

Two separate sampling events were conducted during 1995. Samples were collected from 26 wells, eight of which are either up-gradient or cross-gradient from the landfill area. Groundwater samples collected were analyzed for chemical constituents potentially found in landfill leachate. Sample results indicated a detection of 27 constituents. Table 2-1 lists the maximum concentration of each constituent detected during 1995.

Chloroform was the most prevalent organic constituent detected during the 1995 groundwater monitoring (detected in 13 of the 26 wells). Review of 1995 data indicates that chloroform concentrations in groundwater are at higher concentrations upgradient and cross-gradient than in areas directly down-gradient from the landfill. Chloroform discovered throughout the study area does not appear to originate from the landfill.

This section characterizes the current extent and degree of groundwater contamination present in and downgradient from the landfill site. Included are summaries of water quality data collected during 1992, as well as a potentiometric map and an isopotential contour map for trichloroethylene for data collected in December 1992. Major station water quality information and a tabulated presentation of all of the data will be included in the 1993 Annual Water Resource Monitoring Report.

Figure 2-1 is a potentiometric contour map showing current groundwater flow direction. This map is similar to the map presented in the CMA, but also incorporates data from four new monitoring wells (MTC-3, MTC-4, MTC-5, MTC-6) installed by Morrison Forest Company just east of the landfill. The data from these wells is consistent with previous interpretations of groundwater flow in this area, and shows that there is not significant flow eastward from the landfill.

Two separate sampling events were conducted during 1992. Samples were collected from 26 wells, eight of which are either up-gradient or cross-gradient from the landfill area. Groundwater samples collected were analyzed for chemical constituents potentially found in landfill leachate. Sample results indicated a detection of 27 constituents. Table 2-1 lists the maximum concentration of each constituent detected during 1992.

Chloroform was the most prevalent organic constituent detected during the 1992 groundwater monitoring (detected in 15 of the 26 wells). Review of 1992 data indicates that chloroform concentrations in groundwater are at higher concentrations up-gradient and cross-gradient than in areas directly down gradient from the landfill. Chloroform discovery throughout the study area does not appear to originate from the landfill.



This section characterizes the current extent and degree of groundwater contamination present at and downgradient from the landfill site. Included are summaries of water quality data collected during 1992, as well as a potentiometric map and an isopotential contour map for trichloroethylene for data collected in December 1992. More detailed water quality information and a tabulated presentation of all of the data will be included in the 1993 Annual Water Resource Monitoring Report.

Figure 2-1 is a potentiometric contour map showing current groundwater flow directions. This map is similar to the map presented in the CMA, but also incorporates data from four new monitoring wells (MPC-3, MPC-4, MPC-5, MPC-6) installed by Monsanto Power Company just east of the landfill. The data from these wells is consistent with previous interpretations of groundwater flow in this area, and shows that there is not significant flow eastward from the landfill.

Two separate sampling events were conducted during 1992. Samples were collected from 26 wells, eight of which are either up-gradient or cross-gradient from the landfill area. Groundwater samples collected were analyzed for chemical constituents potentially found in landfill leachate. Sample results indicated a detection of 27 constituents. Table 2-1 lists the maximum concentration of each constituent detected during 1992.

Chloroform was the most prevalent organic constituent detected during the 1992 groundwater monitoring (detected in 12 of the 26 wells). Review of 1992 data indicates that chloroform concentrations in groundwater are at higher concentrations up-gradient and cross-gradient than in areas directly down-gradient from the landfill. Chloroform discovered throughout the study area does not appear to originate from the landfill.



WELL	WATER TABLE ELEVATION (ft)
HL-90-1	3892.14
HL-90-2	3904.38
HL-90-3	3901.72
MPC-1	3925.08
MPC-2	3920.17
HL-94-1	3936.77
HL-94-2	3937.04
HL-94-3	3933.28
83-6	3979.55
13	3881.14
19	3852.29
26	3940.25
28	3880.51
41	3870.19
92	3903.09
I-1	3795.96
I-2	3883.60
I-5	3895.71
I-6	3914.10
MPC-3	3937.51
MPC-4	3939.93
MPC-5	3937.24
MPC-6	3937.18
EPA-1	3936.12
EPA-2	DRY
EPA-4	3909.97
HL-1	3973.16
INF. GALLERY	3912.83

LEGEND

- HL-1 ■ PIEZOMETER
- 83-6 ● MONITORING WELL
- I-6 ▲ IRRIGATION WELL
- 30 □ DOMESTIC WELL
- INFILTRATION GALLERY
- 3900- ISOCONCENTRATION CONTOUR LINE, MAXIMUM 1994 DETECTIONS IN $\mu\text{g/L}$ (DASHED WHERE INFERRED)
- ➔ GENERAL DIRECTION OF GROUNDWATER FLOW

CITY OF HELENA LANDFILL
ADDENDUM TO CORRECTIVE MEASURES
ASSESSMENT
HELENA, MONTANA

STUDY AREA AND
JANUARY 1996
POTENTIOMETRIC SURFACE

FIGURE
2-1



Parameter	Montana MCL (mg/L)	Maximum or Minimum Detection (mg/L)	Outside Relative Compliance Boundary						
			31 (mg/L)	57 (mg/L)	62 (mg/L)	75 (mg/L)	93 (mg/L)	96 (mg/L)	Inf. Gal (mg/L)
Arsenic	0.05	0.007	-	-	-	-	-	-	-
Barium	2.0	0.100	-	-	-	-	-	-	-
Iron	na	1.990	-	-	-	-	-	-	-
Selenium	0.05	0.022	-	-	-	-	-	-	-
Zinc	na	0.030	-	-	-	-	-	-	-
1,1,1-Trichloroethane	0.2000	0.003	nd	nd	nd	nd	nd	nd	nd
1,1-Dichloroethane	0.0070	0.007	nd	nd	nd	nd	nd	nd	nd
1,2-Dichloropropane	0.0050	0.002	nd	nd	nd	nd	nd	nd	nd
Bromodichloromethane	na	0.003	nd	nd	nd	nd	nd	nd	nd
Carbon Disulfide	na	0.002	nd	nd	nd	nd	nd	nd	nd
Chloroform	na	0.020	0.008	0.002	0.010	nd	0.002	nd	nd
Cis-1,2-Dichloroethene	0.0700	0.002	nd	nd	nd	nd	nd	nd	nd
Dichlorodifluoromethane	na	0.002	nd	0.001	0.001	nd	nd	nd	nd
Methylene Chloride	na	0.001	nd	nd	nd	nd	nd	nd	nd
Tetrachloroethene	0.0050	0.024	nd	0.002	0.002	nd	nd	nd	nd
Toluene	1.0	0.002	nd	nd	nd	nd	nd	nd	nd
Trichloroethene	0.0050	0.003	nd	nd	nd	nd	nd	nd	nd
Trichlorofluoromethane	na	0.001	nd	nd	nd	nd	nd	nd	nd
Chloride	na	126.000	-	-	-	-	-	-	-
Cobalt	na	0.020	-	-	-	-	-	-	-
Nickel	na	0.040	-	-	-	-	-	-	-
Nitrate & Nitrite	10.0	42.800	-	-	-	-	-	-	-
Sulfate	na	1860.000	-	-	-	-	-	-	-
Thallium	na	1.200	-	-	-	-	-	-	-
m&p - xylenes	na	0.004	nd	nd	nd	nd	nd	nd	nd
o - xylene	na	0.003	nd	nd	nd	nd	nd	nd	nd
Cyanide	na	9.500	-	-	-	-	-	-	-

Parameters in **bold** indicate results higher than Montana MCL

na Not applicable

nd Not detected

- Not analyzed



TABLE 2-1
MAXIMUM DETECTION FOR WELLS SAMPLED DURING 1995

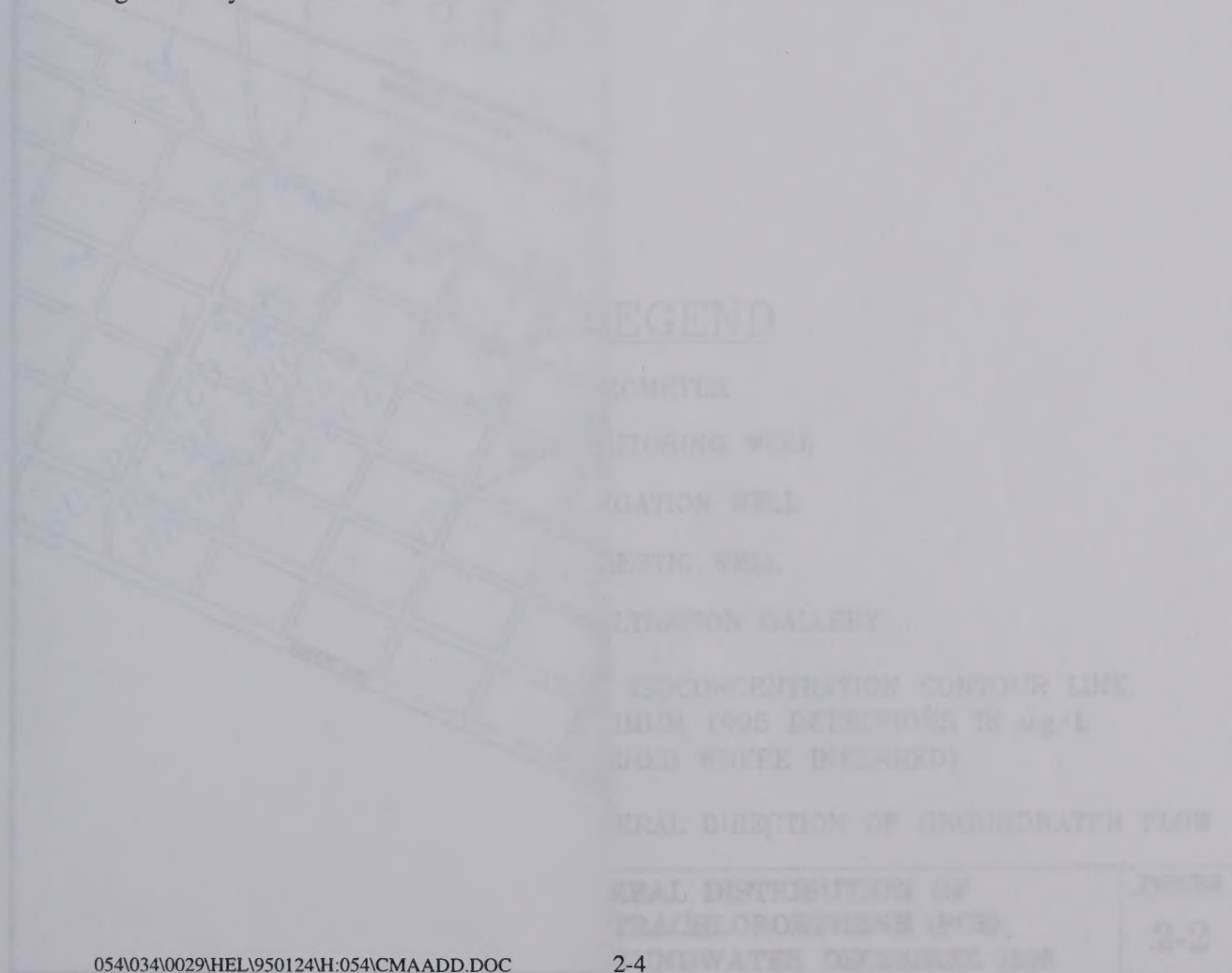
Parameter	Montana MCL (mg/L)	Maximum or Minimum Detection (mg/L)	Up-gradient or cross-gradient								Inside Relative Compliance Boundary					Outside Relative Compliance Boundary											
			83-6 (mg/L)	HL-94-1 (mg/L)	HL-94-2 (mg/L)	HL-94-3 (mg/L)	MPC-3 (mg/L)	MPC-4 (mg/L)	MPC-5 (mg/L)	MPC-6 (mg/L)	EPA1 (mg/L)	MPC-1 (mg/L)	MPC-2 (mg/L)	HL-90-1 (mg/L)	HL-90-2 (mg/L)	I-1 (mg/L)	HL-90-3 (mg/L)	5 (mg/L)	13 (mg/L)	31 (mg/L)	57 (mg/L)	62 (mg/L)	75 (mg/L)	93 (mg/L)	96 (mg/L)	Inf. Gal (mg/L)	
Arsenic	0.05	0.007	nd	nd	0.007	nd	nd	nd	nd	nd	nd	nd	-	nd	nd	-	nd	-	-	-	-	-	-	-	-	-	
Barium	2.0	0.100	nd	nd	nd	nd	nd	nd	nd	0.100	0.100	nd	-	nd	nd	-	nd	-	-	-	-	-	-	-	-	-	
Iron	na	1.990	0.050	nd	nd	nd	0.810	0.180	1.990	nd	0.060	nd	-	nd	nd	-	nd	-	-	-	-	-	-	-	-	-	
Selenium	0.05	0.022	nd	nd	nd	nd	0.010	0.022	0.006	nd	nd	nd	-	nd	nd	-	nd	-	-	-	-	-	-	-	-	-	
Zinc	na	0.030	nd	nd	nd	nd	nd	0.010	nd	0.010	nd	nd	-	nd	nd	-	0.030	-	-	-	-	-	-	-	-	-	
1,1,1-Trichloroethane	0.2000	0.003	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.003	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	
1,1-Dichloroethane	0.0070	0.007	nd	nd	nd	nd	nd	nd	nd	nd	0.002	0.007	nd	0.002	0.002	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	
1,2-Dichloropropane	0.0050	0.002	nd	nd	nd	nd	nd	nd	nd	nd	0.002	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Bromodichloromethane	na	0.003	nd	nd	nd	0.003	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Carbon Disulfide	na	0.002	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.002	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Chloroform	na	0.020	nd	0.004	0.004	0.020	nd	nd	nd	nd	0.004	0.002	nd	0.003	nd	nd	0.004	0.002	0.006	0.008	0.002	0.010	nd	0.002	nd	nd	
Cis-1,2-Dichloroethene	0.0700	0.002	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.002	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Dichlorodifluoromethane	na	0.002	nd	nd	nd	nd	nd	nd	nd	nd	0.001	0.002	nd	0.001	nd	nd	nd	nd	0.002	nd	0.001	0.001	nd	nd	nd	nd	
Methylene Chloride	na	0.001	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.001	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Tetrachloroethene	0.0050	0.024	nd	nd	nd	nd	nd	nd	nd	nd	0.024	0.014	nd	0.012	nd	nd	nd	0.002	0.003	nd	0.002	0.002	nd	nd	nd	nd	
Toluene	1.0	0.002	nd	0.002	nd	0.001	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Trichloroethene	0.0050	0.003	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.003	nd	0.002	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Trichlorofluoromethane	na	0.001	nd	nd	nd	nd	nd	nd	nd	nd	0.001	0.001	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Chloride	na	126.000	23.000	22.000	65.000	22.000	18.000	56.000	13.000	8.000	126.000	51.000	-	30.000	31.000	-	23.000	-	-	-	-	-	-	-	-	-	
Cobalt	na	0.020	nd	nd	nd	nd	nd	nd	0.020	nd	nd	nd	-	nd	nd	-	nd	-	-	-	-	-	-	-	-	-	
Nickel	na	0.040	nd	nd	nd	nd	0.010	0.020	0.020	0.010	0.040	nd	-	nd	nd	-	nd	-	-	-	-	-	-	-	-	-	
Nitrate & Nitrite	10.0	42.800	7.590	6.810	6.120	11.700	37.700	42.800	21.400	4.920	6.830	11.700	-	6.870	1.300	-	6.330	-	-	-	-	-	-	-	-	-	
Sulfate	na	1860.000	92.000	131.000	94.000	179.000	1180.000	336.000	1860.000	38.000	144.000	187.000	-	126.000	66.000	-	116.000	-	-	-	-	-	-	-	-	-	
Thallium	na	1.200	nd	nd	nd	nd	1.200	nd	nd	nd	nd	nd	-	nd	nd	-	nd	-	-	-	-	-	-	-	-	-	
m&p - xylenes	na	0.004	nd	nd	nd	nd	nd	nd	0.004	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	
o - xylene	na	0.003	nd	nd	nd	nd	nd	nd	0.003	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	
Cyanide	na	9.500	nd	nd	nd	0.040	3.420	0.666	9.500	0.036	nd	0.038	-	nd	nd	-	nd	-	-	-	-	-	-	-	-	-	

Parameters in **bold** idicate results higher than Montana MCL

- na Not applicable
- nd Not detected
- Not analyzed

Of the detected constituents only 2 (nitrate and tetrachloroethene) existed in concentration which exceed the maximum contaminant limit (MCL) specified under Montana regulation. Nitrate concentrations upgradient of the landfill were well above those down-gradient so this constituent is not attributable to the landfill. Tetrachloroethene concentrations downgradient from the landfill were consistent with values for 1994. However, in the apparent source area near monitoring well EPA-1, tetrachloroethene concentrations were significantly lower than in 1994. A corresponding drop in tetrachloroethene concentration is expected down-gradient from the landfill in the future.

Tetrachloroethene (also known as perchlorethylene) was detected in 7 of the 26 wells. Figure 2-2 is an isoconcentration map showing the areal distribution of tetrachloroethene in groundwater near the Helena Landfill. Although the PCE plume presented in Figure 2-2 covers a large areal extent, concentrations representing the tetrachloroethene plume are significantly lower than in 1994.



Of the detected constituents only 2 (nitrate and tetrachloroethene) existed in concentrations which exceed the maximum contaminant limit (MCL) specified under SDWA regulations. Nitrate concentrations upstream of the landfill were well above those downstream. Tetrachloroethene is not attributable to the landfill. Tetrachloroethene concentrations downstream from the landfill were consistent with values for 1994. However, in the upstream source area near monitoring well EA-1, tetrachloroethene concentrations were significantly lower than in 1994. A corresponding drop in tetrachloroethene concentration is expected down-gradient from the landfill in the future.

Tetrachloroethene (also known as perchloroethylene) was detected in 7 of the 36 wells. Figure 1-2 is an isopleth map showing the local distribution of tetrachloroethene in groundwater near the Phelps Landfill. Although the PCE plume presented in Figure 1-2 extends a large area, concentrations representing the tetrachloroethene plume are significantly lower than in 1994.



WELL	PCE ($\mu\text{g/L}$) MCL= 5
HL-90-1	12
HL-90-2	ND
HL-90-3	ND
MPC-1	14
MPC-2	ND
HL-94-1	ND
HL-94-2	ND
HL-94-3	ND
83-6	ND
5	1.8
13	3.1
31	ND
57	1.8
62	1.8
75	ND
93	ND
96	ND
I-1	ND
MPC-3	ND
MPC-4	ND
MPC-5	ND
MPC-6	ND
EPA-1	24
INF.GALLERY	ND

ND = NOT DETECTED

LEGEND

ISOCONCENTRATION CONTOUR LINE,

MINIMUM 1995 DETECTIONS IN $\mu\text{g/L}$

(DASHED WHERE INFERRED)

GENERAL DIRECTION OF GROUNDWATER FLOW

MONITORING WELL

INVESTIGATION WELL

DOMESTIC WELL

INFILTRATION GALLERY

FIGURE

2-2

Of the detected constituents only 2 (nitrate and perchlorate) existed in concentrations which exceed the maximum contaminant limit (MCL) specified under maximum groundwater protection. Nitrate concentrations upgradient of the landfill were well above those down-gradient as this constituent is not attributable to the landfill. Perchlorate concentrations down-gradient from the landfill were consistent with values for 1994. However, in the uppermost aquifer near monitoring well ET-A-1, perchlorate concentrations were significantly lower than in 1994. A corresponding drop in perchlorate concentrations is expected down-gradient from the landfill in the future.

Tetrachloroethene (also known as perchloroethylene) was detected in 7 of the 26 wells. Figure 2-2 is an isopleth map showing the areal distribution of tetrachloroethene in groundwater near the Fernald landfill. Although the PCE plume presented in Figure 2-2 shows a large areal extent, concentrations representing the tetrachloroethene plume are significantly lower than in 1994.



WELL	PCE ($\mu\text{g/L}$) MCL= 5
HL-90-1	12
HL-90-2	ND
HL-90-3	ND
MPC-1	14
MPC-2	ND
HL-94-1	ND
HL-94-2	ND
HL-94-3	ND
83-6	ND
5	1.8
13	3.1
31	ND
57	1.6
82	1.8
75	ND
93	ND
96	ND
I-1	ND
MPC-3	ND
MPC-4	ND
MPC-5	ND
MPC-6	ND
EPA-1	24
INF.GALLERY	ND

ND = NOT DETECTED

LEGEND

- HL-1 ■ PIEZOMETER
- 83-6 ● MONITORING WELL
- I-6 ▲ IRRIGATION WELL
- 80 □ DOMESTIC WELL
- INFILTRATION GALLERY
- 5— PCE ISOCONCENTRATION CONTOUR LINE, MAXIMUM 1995 DETECTIONS IN $\mu\text{g/L}$ (DASHED WHERE INFERRED)
- ➔ GENERAL DIRECTION OF GROUNDWATER FLOW

CITY OF HELENA LANDFILL
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ASSESSMENT
HELENA, MONTANA

AREAL DISTRIBUTION OF
TETRACHLOROETHENE (PCE)
IN GROUNDWATER DECEMBER 1995

FIGURE
2-2



3.0 LANDFILL GAS EXTRACTION AND TREATMENT

Extraction and treatment of landfill gas was presented in the CMA as an alternative corrective action for groundwater. This alternative also includes continued groundwater monitoring, and existing institutional controls as explained in Section 5.2 of the CMA. This corrective action will be implemented by the city to reduce risks to water quality as well as increase protection of buildings from migrating methane gas.

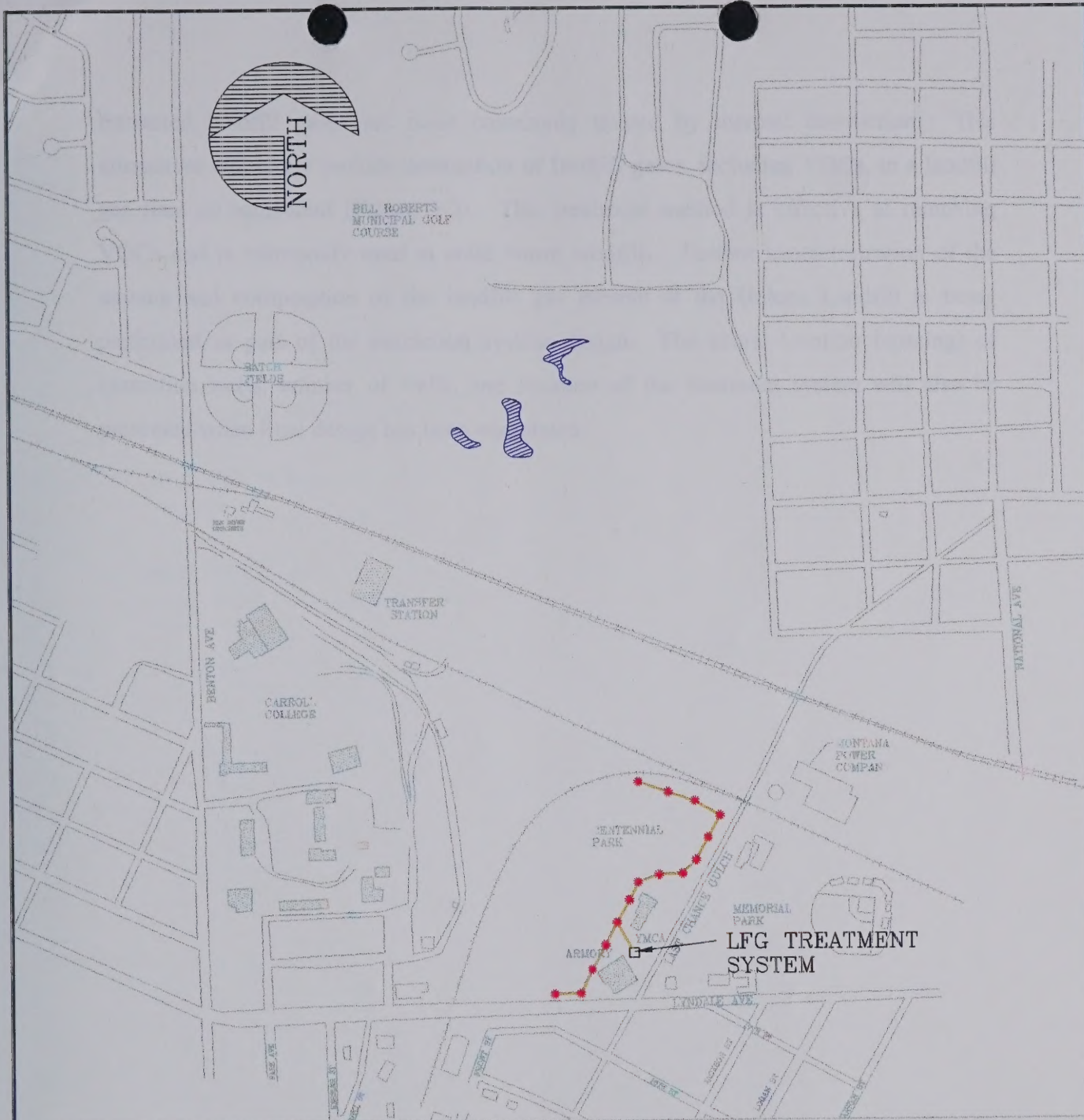
All municipal landfills generate landfill gases as long as organic wastes remain available for biological decomposition. The primary landfill gas generated at the Helena Landfill is methane. Methane can be an explosive gas and concentrations within the landfill are presently being monitored in response to public safety issues currently being addressed by the City of Helena with guidance by the MDEQ Solid Waste Bureau. Under equilibrium, all VOCs have partitioning constants which govern the fraction of the constituent existing as vapor and dissolved in groundwater. Removal of methane and other landfill gases will undoubtedly lower the concentrations of VOCs existing as landfill gases and cause more VOC to volatilize from the dissolved groundwater plume. Extraction would also volatilize VOCs existing as liquids within the buried solid waste. Small reductions in dissolved VOCs are likely to have an impact sufficient to attain groundwater protection standards at the relative compliance boundary.

Landfill gas extraction would consist of several extraction wells installed within the limits of the buried solid waste as shown in Figure 3-1. This system will focus primarily on areas of public safety concern and would also be extended to include the apparent source area for tetrachloroethene contamination. An explosion-proof blower would be used to place a vacuum on these wells. This pressure gradient causes landfill gas to flow to the well and be removed from the landfill area.

Extraction and treatment of landfill gas was presented in the CMA as an alternative corrective action for groundwater. This alternative also includes continued groundwater monitoring and existing institutional controls as explained in Section 2.2 of the CMA. The corrective action will be implemented by the city to reduce risks to water quality as well as increase protection of buildings from migrating methane gas.

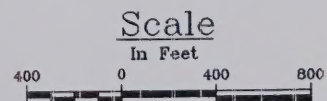
All municipal landfills generate landfill gas as long as organic wastes remain available for biological decomposition. The primary landfill gas generated at the Hickman Landfill is methane. Methane can be an explosive gas and concentrations within the landfill are presently being monitored in response to public safety issues currently being addressed by the City of Hickman with guidance by the MDEQ Solid Waste Bureau. Under existing all city's groundwater protection program which governs the location of the treatment existing as a permit condition in groundwater. Removal of methane and other landfill gases will undoubtedly lower the concentrations of VOCs existing in landfill gases and cause more VOC to volatilize from the dissolved groundwater phase. Extraction would also remove VOC existing in liquids within the buried solid waste. Small reductions in dissolved VOCs are likely to have an impact sufficient to assist groundwater protection standards in the relative compliance boundary.

Landfill gas extraction would consist of several extraction wells installed within the limits of the buried solid waste as shown in Figure 3-1. This system will focus primarily on areas of public safety concern and would also be designed to include the apparent gas flow for transmethane contamination. An explosion-proof blower would be used to place a vacuum on these wells. This pressure gradient causes landfill gas to flow to the well and be removed from the landfill area.



LEGEND

- LANDFILL GAS EXTRACTION WELL
- LFG EXTRACTION MANIFOLD



CITY OF HELENA LANDFILL
ADDENDUM TO CORRECTIVE MEASURES
ASSESSMENT
HELENA, MONTANA

LANDFILL GAS EXTRACTION AND TREATMENT

FIGURE

3-1

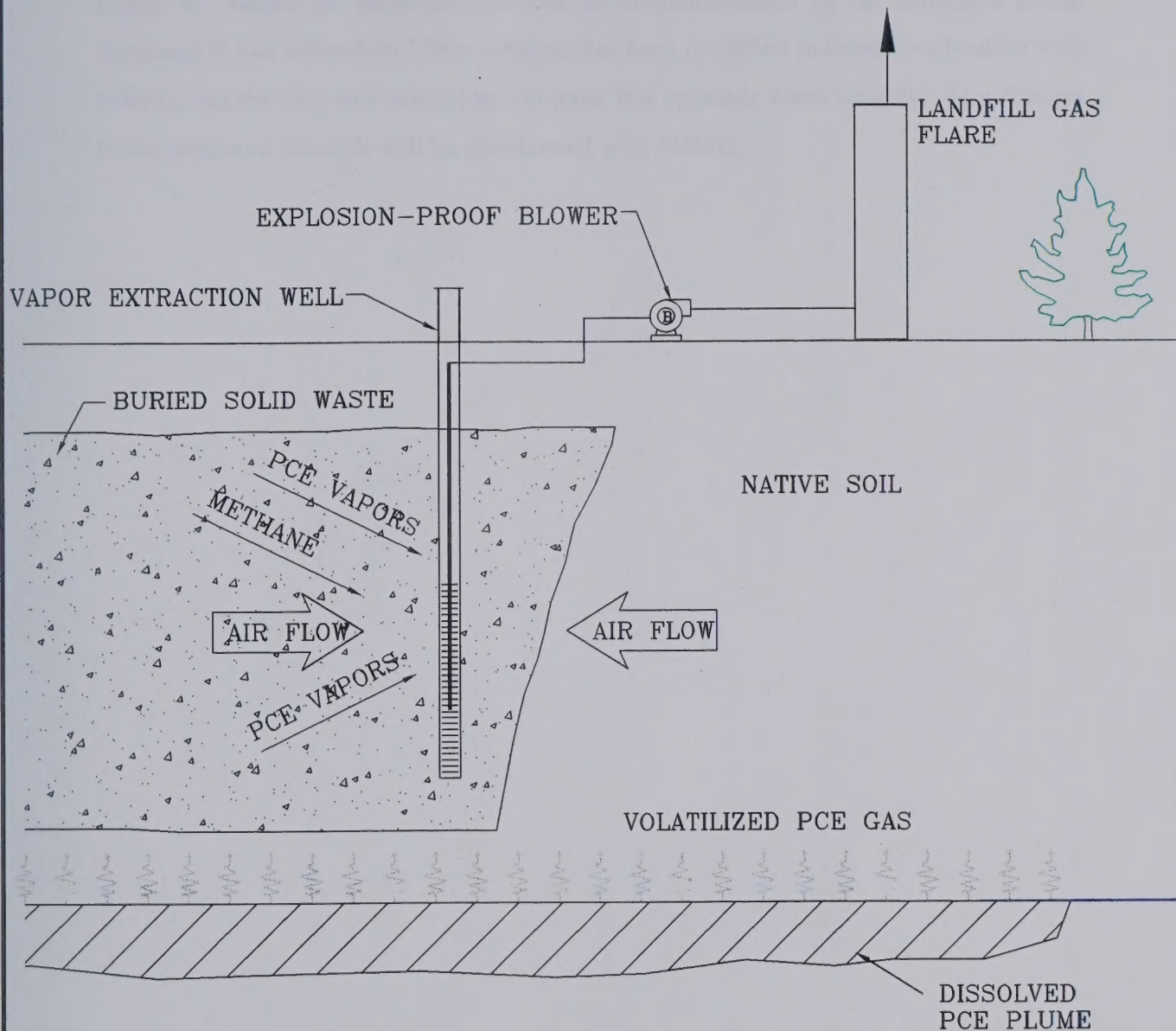
Extracted landfill gases are most commonly treated by thermal destruction. This alternative will likely include destruction of landfill gases, including VOCs, in a landfill gas flare or equivalent (Figure 3-2). This treatment method is effective at removing VOCs and is commonly used at solid waste landfills. Further characterization of the amount and composition of the landfill gas present at the Helena Landfill is being performed as part of the extraction system design. The actual location (spacing) of extraction wells, number of wells, and location of the treatment system will also be presented when final design has been completed.



LANDFILL GAS EXTRACTION SCHEMATIC

3-2

Extracted landfill gas is most commonly treated by thermal destruction. This alternative will likely include treatment of landfill gas, including VOCs, in a landfill gas flare or equivalent (Figure 3-3). This treatment method is effective at removing VOCs and is commonly used at solid waste landfills. Further characterization of the amount and composition of the landfill gas present at the Helena Landfill is being performed as part of the extraction system design. The actual location (spacing) of extraction wells, number of wells, and location of the treatment system will also be provided when final design has been completed.



CITY OF HELENA LANDFILL
ADDENDUM TO CORRECTIVE MEASURES
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LANDFILL GAS EXTRACTION SCHEMATIC

FIGURE

3-2



FIGURE	STANDARD WATER TREATMENT SYSTEM	DESIGNED BY THE U.S. ARMY CORPS OF ENGINEERS
2-2		WASHINGTON, D.C.

4.0 SCHEDULE FOR IMPLEMENTATION OF CORRECTIVE ACTION

Figure 4-1 shows the proposed schedule for implementation of the corrective action discussed in this addendum. This schedule has been compiled in close coordination with MDEQ, and the City will attempt to compress this schedule when feasible. Any changes to this proposed schedule will be coordinated with MDEQ.

FIGURE 4-1: PROPOSED IMPLEMENTATION SCHEDULE

